

P.V.
CLERK'S COPY.
160
175244
56

Vol. II

TRANSCRIPT OF RECORD

Supreme Court of the United States

OCTOBER TERM, 1938

No. 27

**THE TENNESSEE ELECTRIC POWER COMPANY,
ET AL., APPELLANTS,**

vs.

**TENNESSEE VALLEY AUTHORITY, ARTHUR E.
MORGAN, HARCOURT A. MORGAN AND DAVID
E. LILIENTHAL**

**APPEAL FROM THE DISTRICT COURT OF THE UNITED STATES FOR
THE EASTERN DISTRICT OF TENNESSEE**

FILED APRIL 18, 1938.

SUPREME COURT OF THE UNITED STATES

OCTOBER TERM, 1938

No. 27

THE TENNESSEE ELECTRIC POWER COMPANY,
ET AL., APPELLANTS,

vs.

TENNESSEE VALLEY AUTHORITY, ARTHUR E.
MORGAN, HARCOURT A. MORGAN AND DAVID
E. LILIENTHAL

APPEAL FROM THE DISTRICT COURT OF THE UNITED STATES FOR
THE EASTERN DISTRICT OF TENNESSEE

VOLUME II

INDEX

Record from D. C. U. S., Eastern District of Tennessee—

Continued.

Statement of evidence—Continued.

Evidence for complainants—Continued.

Testimony of—Continued.

	Original	Print
Josephus C. Guild.....	5	769
L. P. Sweatt.....	23	785
Laurence B. Howard	37	797
R. W. Mathisson.....	39	799
R. W. Lamar	40	799
Paul O. Canaday.....	44	803
J. S. Pevear	46	804
Walter N. Ford.....	50	808

JUDD & DETWEILER (INC.), PRINTERS, WASHINGTON, D. C., MAY 9, 1938.

Record from D. C. U. S., Eastern District of Tennessee—
Continued.

Statement of evidence—Continued.

Evidence for complainants—Continued.

Testimony of—Continued.

	Original	Print
W. L. Yoder.....	56	813
N. M. Argabrite.....	73	828
H. R. Bland.....	94	844
John Wisdom	95	845
J. C. York.....	102	851
Charles E. Ide.....	104	853
Edward E. Nelson.....	113	860
Walter M. Hood.....	114	861
James M. Barry.....	116	862
Henry B. Sargent	142	882
Ruling upon application for subpoena duces tecum	156-h	905
Testimony of Wells M. Stanley.....	185	933
Hammond Green	221-b	969
James A. Longley	223	970
J. L. Street.....	229	975
Frank B. Ostermueller.....	244	988
Charles A. Collier.....	253	995
D. R. Bonner	261	1003
Wm. W. Jacobs.....	275	1014
Charles E. Perkins.....	279	1018
Clarence Watson	288	1024
Paul E. Shacklett	293	1029
Clem R. Winkler.....	296	1032
W. E. Wilkerson.....	314	1047
J. O. Henkle.....	317	1050
Herbert J. Scholz.....	328	1058
Joe W. Anderson.....	355	1084
E. D. Bass.....	357	1086
George R. Parker.....	362	1089
M. B. Penn.....	366	1093
O. J. Miller.....	367	1100
Walter N. Ford (recalled).....	394	1125
R. W. Lamar (recalled)	399	1129
Deposition of A. E. Yates.....	412	1140
Testimony of R. W. Putnam.....	423	1145
Ford Kurtz	470	1189
T. J. Davis.....	532	1244
Phillip Sporn	539	1251
Walter M. Robinson.....	558	1264
G. H. Middlemiss	560	1267
Albert S. Crane	577	1280
Fred J. Rankin.....	587	1289
Francis E. Frothingham.....	606	1303
John W. Woodall.....	627	1321
Hurat Mauldin	631	1324
Roy McCullough	633	1326
F. T. Mastin.....	633	1326

Record from D. C. U. S., Eastern District of Tennessee—
Continued.

Statement of evidence—Continued.

Evidence for complainants—Continued.

	Original	Print
Ruling on questions of depositions.....	637	1329
Deposition of R. Carter Pittman.....	641	1334
A. B. Haswell.....	659	1348
T. L. Bonner.....	661	1350
J. F. Towry.....	663	1352
E. W. Carmack.....	665	1353
R. H. Bandy.....	668	1356
Mrs. Nellie Armington.....	670	1357
Chester Gause.....	672	1359
Quincy L. Caughman.....	674	1360
R. C. A. Kittridge.....	675	1361
Testimony of Wm. Kelly.....	677	1362
L. E. Willson.....	710	1391
J. F. Burleson.....	715	1396
John A. Dunlap.....	717	1398
Gary M. Freeman.....	720	1400
Kenneth Markwell.....	728	1410
L. R. Lefferson.....	729	1411
Frank A. Newton.....	736	1417
Harry M. Addinsell.....	745	1425
Barney E. Eaton.....	752	1434
Request for subpoena duces tecum.....	755	1437
Testimony of Homer T. Harle.....	757	1439
Charles C. McWhorter.....	760	1441
L. W. Gentry.....	761	1442
Roy A. Smith.....	762	1443
Edward L. Moreland.....	766	1447
Wendell L. Willkie.....	830	1502
F. C. Weiss.....	835	1507
Stipulation re statement by Mr. Lillenthal.....	843	1514
Requests for subpoenas duces tecum.....	859	1528
Rulings of court on certain evidence, etc.....	863	1531
Evidence for defendants.....	891	1534
Testimony of Lewis H. Watkins.....	891	1534

[fol. 5] JOSEPHUS CONN GUILD was called as a witness on behalf of the complainants and, having been first duly sworn, was examined and testified as follows:

Direct examination:

I am 49 years old and was born and live in Chattanooga. I am President of The Tennessee Electric Power Company. When The Tennessee Electric Power Company was formed in 1922 I was elected a Vice President and served in that capacity until 1926. At that time I was put in charge of the property in Tennessee. In 1927 I was made Vice President and General Manager, and in 1932 I was made President, which office I have held since that time.

The map (offered and received in evidence as Complainants' Exhibit 7) is a map of Tennessee and a part of neighboring states entitled, "The Tennessee Electric Power Company map showing transmission system and connections" and shows the transmission system and connections of The Tennessee Electric Power Company. The distribution systems are not shown, but we have distribution systems in Chattanooga and Nashville and in 455 other communities in the state which cannot be shown on that scale map. The two main load centers of the Company are Chattanooga and Nashville, and there are also load centers, among others, in Murfreesboro, Columbia, Lewisburg, Fayetteville, Lenoir City, Harriman and Coal Creek. The load centers are not designated by any special mark. The colored background of the map indicates the counties where we have franchises in which we serve and in which we hold ourselves out to serve in Tennessee, and includes four counties in Georgia. We serve sixty-six counties in Tennessee and four in Georgia. With the exception of the cross-hatched territory north of Nashville, all of the territory served by The [fol. 6] Tennessee Electric Power Company is within a 100 mile radius of one of the dams already constructed, or to be constructed by the TVA. One hundred miles is not the maximum feasible transmission distance, as you can go 200 or 250 miles, or something of that sort, very easily. I just used 100 miles because I wanted to show how close they were.

The memorandum (offered and received in evidence as Complainants' Exhibit 8) is a list showing the installed

7

[fol. 5] JOSEPHUS CONN GUILD was called as a witness on behalf of the complainants and, having been first duly sworn, was examined and testified as follows:

Direct examination:

I am 49 years old and was born and live in Chattanooga. I am President of The Tennessee Electric Power Company. When The Tennessee Electric Power Company was formed in 1922 I was elected a Vice President and served in that capacity until 1926. At that time I was put in charge of the property in Tennessee. In 1927 I was made Vice President and General Manager, and in 1932 I was made President, which office I have held since that time.

The map (offered and received in evidence as Complainants' Exhibit 7) is a map of Tennessee and a part of neighboring states entitled, "The Tennessee Electric Power Company map showing transmission system and connections" and shows the transmission system and connections of The Tennessee Electric Power Company. The distribution systems are not shown, but we have distribution systems in Chattanooga and Nashville and in 455 other communities in the state which cannot be shown on that scale map. The two main load centers of the Company are Chattanooga and Nashville, and there are also load centers, among others, in Murfreesboro, Columbia, Lewisburg, Fayetteville, Lenoir City, Harriman and Coal Creek. The load centers are not designated by any special mark. The colored background of the map indicates the counties where we have franchises in which we serve and in which we hold ourselves out to serve in Tennessee, and includes four counties in Georgia. We serve sixty-six counties in Tennessee and four in Georgia. With the exception of the cross-hatched territory north of Nashville, all of the territory served by The [fol. 6] Tennessee Electric Power Company is within a 100 mile radius of one of the dams already constructed, or to be constructed by the TVA. One hundred miles is not the maximum feasible transmission distance, as you can go 200 or 250 miles, or something of that sort, very easily. I just used 100 miles because I wanted to show how close they were.

The memorandum (offered and received in evidence as Complainants' Exhibit 8) is a list showing the installed

capacity of the generating stations of The Tennessee Electric Power Company.

The list (offered and received in evidence as Complainants' Exhibit 9) shows the transmission line interconnections with other companies. The location of these interconnections are shown on the map, Complainants' Exhibit 7. The one with the Aluminum Company of America is indicated at Maryville, Tennessee, just south of Knoxville. The Carolina Power & Light Company interconnection is located in the City of Knoxville, just outside of the city limits of Knoxville. The Kentucky Utilities interconnection is just north of Knoxville, at Pruden, Tennessee. The Alabama Power Company interconnection on this map is the interconnection that runs from Nashville to Centerville, Muscle Shoals and Alabama Power Company. The Georgia Power Company interconnection is indicated at Chattanooga, just south of the center.

The Hales Bar steam plant, which is located seventeen miles from Chattanooga at the site of the hydro plant, was designed so that its generating capacity can be increased [fol. 6-a] very easily to 100,000 kilowatts. It is now 40,000 kilowatts. At the Bordeaux steam plant, near Nashville, we bought the turbine and are now preparing to start construction. That is now designed for 25,000 kilowatts and can be built up to 150,000 kilowatts. The Company also owns water power sites for development when and as business expansion would justify. There is the No. 1 Plant on the Ocoee River now in operation and the No. 2 Plant. We own 3,558 acres of land above the No. 2 Plant where we can build No. 3 Plant on the Ocoee River, which plant will have a capacity of 35,000 kilowatts. Above the Blue Ridge plant on the Toccoa River—the same river is called the Toccoa River in Georgia and the Ocoee River in Tennessee—we own another site where we have 2,206 acres of land. There is 11,000 kilowatts of development that can be placed there. Below the Great Falls plant on the Caney Fork River, we own another dam site and 535 acres of land at that point and can develop a plant of 30,000 kilowatts capacity. The dam sites were procured with a view to development as the Company's business expanded.

[fol. 7] In addition to these electric facilities, the Company owns and operates other utility properties. We operate street car systems in Chattanooga and Nashville and have a bus operation in both towns. We own water plants serving

the municipalities with water in Columbia, Cowan, Harri-man, Lexington, Niota, Richard City, Shelbyville, South Pittsburg, Tellico Plains and Winchester, in Tennessee, and Blue Ridge, in Georgia. We also own ice plants in Athens, Carthage, Clinton, Fayetteville, Lenoir City, Pikeville and Shelbyville, in Tennessee. In Blue Ridge, Georgia, we own a small telephone company that is interconnected with the A. T. & T. system.

The relationship between the operation of the electric utility and other utilities owned by The Tennessee Electric Power Company is absolutely intermingled. The financing is the same, the bookkeeping is the same, the men operating the electric part have duties in the transportation part, the ice part and the water part, and it is all one proposition. The financing, management, accounting and various other operations connected with these several kinds of utilities are carried on jointly and the severance of one of those operations from the other would affect the Company adversely financially.

The Tennessee Electric Power Company has outstanding \$49,313,300 par value of bonds; 241,296 shares of preferred stock with a par value of \$100 (a total par value of \$24,129,600), and 425,000 shares of no par value common stock. All of the securities were assumed or issued with the approval of the Railroad and Public Utilities Commission of Tennessee.

The tabulation (offered and received in evidence as Complainants' Exhibit 10) shows the miles of transmission lines, the miles of distribution lines, the installed generating capacity in kilowatts, the number of customers, the total kilowatt-hour sales, the total industrial sales, and the percentage of industrial sales to the total sales in kilowatt-hours for the years 1927 through 1936. The last figure is for the year ending September 30, 1937, as we haven't a full year for 1937. It also shows the residential average kilowatt-hour use per customer for the same years, 1927 through 1937, the residential average revenue per customer over the same period, the residential average rate per kilowatt-hour over the same period, and the number of communities served over the same period.

The Tennessee Electric Power Company's predecessor companies started business in Chattanooga as the Brush Electric Company in 1882. The Company started a second electric development in the State at Nashville a few years

later. These were small steam generating companies that were pioneering the development of electricity for lighting and power—mostly lighting in the early days. As time went on, the companies were consolidated, other little companies were started, and they were consolidated and built up until there were consolidations in Nashville and Chattanooga with the railway operations. In 1904 or 1905, the idea of hydro-electric energy was brought into the state and developments were started at that time, which was shortly after Niagara Falls was put in operation. Construction was started on some of this and finally, in about 1912 or 1913, hydro-electric power as such was brought into Tennessee. Since that time there have been further mergers, further consolidations and The Tennessee Electric Power Company itself was formed in June, 1922. This has been a process of connecting independent and separated operations into a unified and integrated system.

This unification has resulted in economies in operation. As the system grew and as the service was extended farther [fol. 9] and farther and the developments of the art and the whole unification of the property continued, it developed greater economies in operation, management and financing. This development in integration of The Tennessee Electric Power Company from the service just in Nashville and in Chattanooga has developed to where we now have reached out and are serving 66 counties in Tennessee and 4 in Georgia. It has enabled us to extend our system and build it up as one cohesive operating unit and also to go out and reach larger territory and serve more people. The Company has always been anxious to go out and serve any new areas and we are pushing forward to serve the whole territory thoroughly and completely.

Except for interruptions caused by lightning or similar causes, the Company has never in its history refused service to any customer. It has never, in the whole history of the Company, from shortage of power or other inadequacy of facilities of any type, refused such service and it has sought the service rather than refused it. It has always solicited business and been able to carry its own load on its own system. That is its present policy.

The Company has used every known form of promoting the use of electricity to increase the business and electrical development of the Company. We have power salesmen and a Power Sales Department. We have lighting salesmen and

a Lighting Sales Department. We have power salesmen that go into people's plants and help them in electrifying their plants. We have an Industrial Department that helps new industries that want to locate in this territory, giving them all the information possible. We have a Merchandising Department which is very active and which promotes the sale and further use of electrical refrigerators, washing machines, ranges, water heaters, and all household electrical [fol. 10] devices. By so doing we increase our business and the customer gets the benefit of electricity. We have an agricultural engineer and an Agricultural Engineering Department, which goes out to the rural areas and promotes the further extension of our rural business.

I believe that the industries of Chattanooga are more thoroughly electrified than any other community of like size in the country. We started in pretty early in pushing the electrification of the manufacturing plants in the City of Chattanooga. That has been going on pretty steadily since the first hydro power came in 1912. You can name on the fingers of one hand the industries that are not electrified in Chattanooga. These various services are available to the customers and prospective customers of the Company. We hold ourselves out to do that and serve everybody.

I believe that The Tennessee Electric Power Company or its predecessor, Tennessee Power Company, was the first company to develop interconnections with other companies. It made an interconnection in 1913 with the high tension line from Parksville and Dalton, Georgia, to the company in Georgia. That was the first interconnection by two companies having no financial connection of any sort, of a major transmission line between the two of them to interchange power. This was the first development in the art of management and distribution of electricity, and that policy of interconnecting has been going on continually. The matter of interconnections involves questions of economy of operation as well as questions of capacity.

The Tennessee Electric Power Company has about 3,500 employees. We have employees that have been with us a great many years. Eight per cent of our employees have been with the Company 25 years or more and thirty-five per cent have been with us ten years or more. We have grown in the later years, so if you take into consideration this increase, the percentage would increase.

[fol. 11] The rates of The Tennessee Electric Power Company are regulated by the Tennessee Railroad and Public Utilities Commission and by the Public Service Commission of the State of Georgia. We do business in Tennessee and in Georgia, so both Commissions regulate our rates. The rates of the Company are uniform throughout Tennessee and the parts we serve in Georgia.

Since 1927 I have been in charge of the management of The Tennessee Electric Power Company and know of my own knowledge whether the rates that we have been charging to the public have been uniform under regulations imposed by the Tennessee Railroad and Public Utilities Commission. The rates which the Company now charges and has been charging in the 66 counties in which it operates in Tennessee for the same class of service is, and for some years has been, uniform under the regulation of the Railroad and Public Utilities Commission of Tennessee. To my knowledge the rates charged by the Company in the 4 counties in which it operates in Georgia have been regulated by the Georgia Commission so as to bring about a uniformity of rates for the same class of service in the 4 counties. I also know from my management of the Company whether or not the rates have been reduced from time to time or changed from time to time by order of the Commission of Tennessee. The list (offered and received in evidence as Complainants' Exhibit 11) is a list of rate reductions made by the Company under the regulation of the State Commissions.

Cross-examination:

In 1932 the Company sold 353,120,939 kilowatt-hours; in 1936, 682,272,122 kilowatt-hours, and for the year ending September 30, 1937, 767,646,665 kilowatt-hours.

With reference to the Coffin Award, I have not the exact [fol. 12] reading off the citation which I have at the office, but I believe it says "For the company that does more for the development", or "does more for the betterment", or something "for the electric industry of the United States". I would have to check on the matter of load increase for the year 1936. We had some increase in use, but I will not say it was a load increase if I do not have the figures.

The common stock of The Tennessee Electric Power Company is owned about 99 percent by The Commonwealth & Southern Corporation. There are 241,000 shares, I believe the figure is, of preferred stock which also has voting rights.

The voting power of the common stock, however, heavily preponderates. Mr. Wendell Willkie is the President of The Commonwealth & Southern Corporation, but he is not an officer of The Tennessee Electric Power Company. Mr. Willkie represents the Company in the course of negotiations, but I would not say frequently. I consult him a very great deal when he undertakes negotiations. He represented the Company in the course of the negotiations of the January 4 contract.

“Mr. Fly:

Q. And he has represented you in various capacities in negotiating with the Tennessee Valley Authority and others, has he not?

A. Yes.

Mr. R. T. Jackson: I object to that as not proper cross examination. It has no relation to the examination in chief.

Mr. Fly: I am trying to establish the executive position of this gentleman as President of The Tennessee Electric Power Company. That has been stressed, and his control and influence over the operations has been stressed.

Judge Allen: The objection is overruled.

Mr. R. T. Jackson: May I have an exception noted, please?

[fol. 13] By Mr. Fly:

Q. What dividends did your company pay on the common stock in the last four years, Mr. Guild?

A. I would have to look that up. The dividends have not amounted to very much. I will have to check on my records. I cannot tell you right off-hand.

Q. If I suggested that they were \$913,000—

A. I will have to look the matter up. I can find it out in two minutes. We have the figures in the court room.

Mr. Jackson: I renew my objection that this is not proper cross-examination. I don't want to interrupt.

Judge Gore: You mean, Mr. Jackson, under the Federal rule?

Mr. R. T. Jackson: That is right. It has no relation to the examination in chief.

Judge Gore: Personally, I don't like that rule.

By Mr. Fly:

Q. Will you get that figure, Mr. Guild?

Judge Allen: The Circuit Court has never overruled Judge Gore with reference to that.

A. I will have to get the figure. I think maybe I can get it in the court room, if you will wait until I go and look up the figure, if you desire me to do so.

Mr. R. T. Jackson: May I have an exception noted to the ruling of the Court?

Judge Gore: As a matter of economy of time, Mr. Jackson, don't you think it would be wise to let Mr. Fly go into any matters he wants to bring out from this witness, provided, of course, it is competent, rather than to limit him in cross-examination to what he referred to in the original examination?

Judge Allen: The Court is disposed to exercise considerable latitude in the admission of evidence on behalf of both litigants, Mr. Jackson. I might say, speaking for myself, that there were some questions which you asked, to which an objection was not interposed, and if I had been sitting as I usually sit as a trial Court, I should have myself interposed an objection. But we are disposed to allow very considerable latitude in the examination, and we are disposed to allow latitude in cross-examination, to both your clients and the Authority.

Mr. R. T. Jackson: I assume that would be true. Of course, this, I think, is not proper cross-examination. That is the reason for my objection.

[fol. 14] Judge Allen: The question will be allowed.

The Witness: Shall I proceed and try to find the figures?

Judge Allen: There was a question?

By Mr. Fly:

Q. If you will furnish the figure for the record—I believe it is \$913,000—it will be satisfactory to me if you will furnish it to the court reporter later.

Mr. R. T. Jackson: I did not get an opportunity to note my exception. I presume Mr. Guild can give that later."

(Counsel for complainants at a later point submitted to defendants a tabulation of the dividends on the common

stock of The Tennessee Electric Power Company for the four years ending 1936 which had been prepared from the books of the Company, which tabulation was then received in evidence as Defendants' Exhibit 1.)

We have never disposed of any of the related properties of the Company such as the traction, ice and water properties. I am not speaking for the Commonwealth & Southern. I am speaking for The Tennessee Electric Power Company. We have never disposed of any except the water system in Lafollette, where the PWA loaned money to build a competing system, and we had to sell it out for a third of its cost. That is the only system I know of that we have disposed of. They "jewed us down" to \$16,000 when it cost about \$75,000.

The last hydro plant built in the last few years was built at Blue Ridge, Georgia, in 1931 or 1932. The Company has not undertaken to build any other since that time. There has been a well-known depression. The Company, without qualification, has always been anxious to serve new areas. We have to serve them. A company as vast as ours had to serve them on an economic basis.

[fol. 15] I cannot answer "Yes" or "No" to the question whether the Company is prepared to serve rural areas only in case the Company finds it profitable. In a great many cases we go out and serve rural areas when at the time we serve them they are not profitable, with the hope and with the realization of our expectations of them being profitable, and that has been the history of our rural electrification policy. Possibly the first year it is not profitable, but as it grows and develops it does become profitable. Therefore, the answer is "Yes" and "No". We are not an eleemosynary institution. We have to make a profit eventually.

In a great many cases in the rural communities there is a rural community here and there are rural customers along the line. We build the line and serve the rural customers and the small community. Neither the small community nor the rural customers themselves might be served unless they were lumped together. Maybe my explanation is poor, but perhaps there is a community where we could not build a line to it without picking up the rural customers. The community is not profitable and it will not stand on its own feet. We build the rural line and tie the rural distribu-

tion to the rural community and it does become economically feasible to do that work. So the rural line itself does not always have to be profitable. That is the best explanation I can make. The lines I was referring to just then were not lines leading out for any great distance from a town or urban center, but we have lines leading out from urban centers into the country. Some connect up sma' communities.

I cannot give the percentage of farm electrification in Tennessee without a definition of that term. There are about ten different definitions of a rural customer or a farm customer, and the definition is so widespread that we can go on one definition to about 17,000, I think, or to [fol. 16] 55,000. I haven't any figure eliminating the farms that immediately surround the urban centers. With reference to the Edison Electric Institute figures of farm electrification, showing only 3.6 per cent of the farms in Tennessee with electric service in 1933, I don't know what assumptions were taken as to the farms. You can take the assumptions on those things and figure out various percentages, and I am not familiar with the particular assumption. I do not know whether or not we make reports to the Edison Electric Institute. I do not know that Tennessee ranks 39th of the states in the Union in the percentage of farm electrification.

Referring to Complainants' Exhibit 7, it is not feasible to serve domestic rural consumers off a 120,000 volt line such as that between Great Falls and Coulterville. You don't serve rural customers off high voltage lines. In preparing this map, I did not mean to indicate that we were rendering retail and domestic service everywhere that these lines are spread on the map, but that as far as it was economically possible we were rendering service in the area on that map in pink. That does not mean we serve every customer there. Answering the question, it does not mean that every line on there is a 120,000 volt line. We are serving some rural customers off 13,200, 11,000 and 2300 volt lines. We don't serve them off lines of higher voltage. Also on the map, a whole lot of distribution lines are not indicated.

I haven't with me the figure as to the total amount of power generated in 1936.

By Mr. Fly:

Q. Suppose I give you the figure. I will ask you if this is correct—

A. I would not know, but you can give me the figure. I would not agree it was correct until I checked it.

Mr. Jackson: I understand that all this line of testimony is subject to our objection as not being proper examination, objection, and exception allowed?

Mr. Fly: Your honor, I need not discuss this, but they have gone to great extent into generating capacity and the supply they have available, and that sort of thing, and, of course, if it is going in on direct we must give it a little attention on cross.

Judge Gore: We are overruling your objection.

[fol. 17] Mr. Fly: I preferred not to go into all this junk.

By Mr. Fly:

Q. Mr. Guild, do you have here in the court room your report to the Tennessee Railroad and Public Utilities Commission for 1936?

A. I haven't got it, no, sir. Maybe somebody else has got it. Possibly you have a copy of it.

Judge Allen: Mr. Jackson, the Court would prefer to have a specific objection to every question.

Mr. R. T. Jackson: I just disliked interrupting because I thought the Court had adopted the policy that resulted in my objections being overruled, and I did not like to interrupt.

Judge Martin: That was why I made the comment that I did, that I held the rule that an objection ought to be made and ruled on its form on the question asked. Counsel might assume too much in assuming the Court had excluded and would exclude certain matters which the Court might deem incompetent. Therefore we prefer to have the objection made to any question asked which you deem it important enough to object to for the purpose of the record so that there can be no mistake.

Mr. R. T. Jackson: I appreciate that. I had thought this was a little different in that it was a question of policy as to

whether the examination was to be restricted as to the examination in chief, and, the Court having adopted their rule—

Mr. Fly: I am going into the question of supply and demand, the very same points that he went into.

By Mr. Fly:

Q. Mr. Guild, the figures that I would like to have are your generation for 1936. I think you will find that to be 695,127,900 kilowatt hours.

Mr. R. T. Jackson: I think that if this witness is to supply certain figures, it is sufficient to ask for the figures, and not put counsel's figures in the record.

Mr. Fly: I would not try to lead the witness. I am trying to aid him.

Judge Allen: Let us not have any controversy. The question will be competent if the witness is asked if that is correct.

By Mr. Fly:

Q. I will ask you if that is correct.

Mr. R. T. Jackson: Exception."

[fol. 18] "Judge Allen: Just a moment. Let the witness answer, if that is correct.

Mr. Fly: He says he will need to refer to his figures.

Judge Allen: Let us have the answer.

The Witness: I don't know without checking my own figures.

Judge Allen: All right.

Mr. R. T. Jackson: I understood counsel was asking the witness to get information for him.

Mr. Fly: I was asking the question to refresh his recollection.

Judge Allen: You asked the specific question whether this figure was correct, and the answer is that the witness does not know."

It is possibly true that in 1936 the Company sold far more power than it generated. I am just saying possibly now. I haven't the figures in front of me. I, of course, know that the Company was buying considerable power in 1936, but cannot give the exact figure. I know we bought a large

amount of power in that year, including power from the TVA under the January 4th contract on which I think stipulations have been made, but I cannot check the figures right off the bat.

Since 1933 there have been some improvements with respect to generating capacity made to some of the plants which permit them to carry a load. It is very small. We are now engaged or about to engage in the building of a new steam plant in the neighborhood of Nashville which will have a capacity of 25,000 kilowatts.

[fol. 18a] I know that the Company has a line leading into Chickamauga Dam and a line leading into Norris Dam where we furnished power for construction. The same was done at Chickamauga. We have an interconnection with the Alabama Power Company at Wilson Dam at present and through the cooperation of the Alabama Power Company a connection to Wilson Dam.

The Company does not own Hales Bar Dam. The Government owns it.

The Company's lines extend across the state line into Dade County, Georgia, but do not go very far. That is up on top of the mountain and is contiguous to Chattanooga. In Walker County, Georgia, we go a little further down. In Catoosa County, in general, we go down to about Chickamauga Park. That is ten or twelve miles. The Georgia Power Company serves the territory south of that and I don't intend to indicate we go way down here to LaFayette.

The Tennessee Public Service Company also renders service in the colored area on the map of Tennessee (Complainants' Exhibit 7) in the vicinity of the City of Knoxville. There are also a few municipal plants operating in the general area that is colored on the map.

Examination by the Court:

There is a municipal plant at Lebanon which we supply the power to. They had an old steam plant and we have been selling it power. There is a plant at Cookeville which we supply a portion of the power to. There is a plant at Tullahoma to which we supply all of the power for the municipality and they in turn resell it. These are not all of [fol. 19] the municipal plants in Tennessee. There are very few municipalities, unless they are served by the TVA or ourselves, that generate their own power. I think Cooke-

ville is the only one that does, but I will have to check the matter.

Cross-examination continued:

The Kentucky-Tennessee Light & Power Company does not serve customers in the colored area. It is up in the area above Nashville, around Springfield in Robertson and Montgomery Counties.

The City of Knoxville could not be served with an 11 kv. line. You have to have the carrying capacity of the line of a sufficient size to carry the load. It would take high voltage lines to serve the City of Knoxville, for example, or some sort of generating plant. You wouldn't serve it on an 11 kv. line.

I don't think one line is quite sufficient to serve a City the size of Chattanooga. For instance, coming into Chattanooga there are two 44 kv. lines from Hales Bar, one insulated for 154,000, which is operated at 120,000 volts. There is one 120,000 volt line coming in from the Georgia system, an interconnection, and a 120,000 volt line coming in from the Ocoee plants in Eastern Tennessee and that end of the system. That is what Chattanooga has at present to serve it. I don't say that it is absolutely necessary to have just that set-up, but this is an illustration of what a community of this size has at the present time. It depends on conditions, the capacity and size of the generating plants, as to what you need. You could not serve Chattanooga with one 22,000 volt line, but those lines are capable of being enlarged.

[fol. 20] A 44 kv. line could serve a customer of 10,000 kw. at a distance of fifty miles. That would not be a tight squeeze. It depends on the size of the copper. It is feasible. I shouldn't think that it would do with much less than that.

Some of these municipally owned plants in the colored area on the map were municipally owned prior to the time that the TVA began operations here. Most of those plants were not generating their own power. They were buying their power from us. Lebanon and Tullahoma are examples. I don't know exactly when Cookeville made a contract to purchase part of its supply, but there are possibly more of them that I cannot recall right at present. Springfield is one of them.

Referring to Complainants' Exhibit 8, Ocoee Plant No. 2 was operated during 1937, but I am not able to furnish the number of kilowatt-hours produced during this year. The steam plant at Ocoee No. 1 was operated during 1937 for just a short period, but it was not operated at all in 1934, 1935, or 1936. I haven't figures in my head as to how much energy was generated by the Company at the steam plant at Hales Bar during 1937. I have listed the generating capacity at that plant. We have been running Hales Bar steam plant in 1937, but I am not able to tell the number of kilowatt-hours generated in that plant over any one period. I can get the information, but I just cannot tell you off the bat. It had a very small amount of generation in 1934 and 1935. I will have to check it in regard to 1936. I think we ran it more in 1936 than in some of the other years. I don't know what you mean by relatively small, but will give you all those figures if you would like to have them.

I do not know how much energy was generated in 1934 through 1936 in the Harms hydro plant. Harms is a very small hydro plant in Middle Tennessee. The number of kilowatts it generates is practically nothing and is used for voltage regulation and for breakdown service. I am not attempting to say it is large, but it is a 192 kilowatt [fol. 21] plant and it is running and it performs a function. The Murfreesboro hydro plant runs on the same basis as the other. It helps the voltage conditions out in that end of the country near Walnut Hill. It does not generate many kilowatt-hours. I will admit it is small. I don't know why the Sparta hydro plant should not have been operated in 1936. Sparta ran. It works like the other plants for voltage regulation and makes some current. If anything breaks down on any of the other lines it can supply some of the customers.

We consider the Nashville steam plant capable of generating 48,000 kilowatts. At the Nashville steam plant under certain weather conditions, with the temperature of the water in the river above 80, the amount of generation is cut down slightly. You are going into efficiencies of these operating plants under varying conditions. In the summer time when the water which we use for condensing gets warm, you couldn't get 48, but that is the name plate rating and it can do it and has done it under proper operating conditions.

The Erin steam plant is one of the isolated plants over on the other end of the property. It operates if anything happens to the transmission line, as a standby. All of the plants listed here are capable of producing the amount set out behind them. They can operate and can put out those amounts of current. We didn't put any plants in the list that were junk. I don't mean to indicate that they can put out those amounts of current only if conditions are extremely favorable.

What I mean by voltage regulation is this. If you have some rotating capacity on a transmission line of a comparatively small capacity, you put a little rotating capacity on the other end of it. Even though it does not build up much current, it helps the voltage and boosts it up and keeps it on a proper level. These little plants are useful for that purpose and to put out some power.

[fol. 22] I will be glad to get you the date of the last time the Mascot steam plant was operated since 1934 and not try to tell you from memory exactly when it operated. It has been a good while since Mascot plant has been operated. It has a 750 kilowatt turbine and has not been operated in the last three or four years. The Burns oil engine carried quite a considerable load over there until we completed the transmission line a short time ago. I don't know exactly when Burns was operated, but what I said about the others applies to Burns. If it were not for the Jamestown steam and oil equipment plant, Jamestown would not be able to have any light. It is an isolated plant. It is the only source of power at Jamestown. Jamestown is a steam and fuel plant both. The Oneida plant is operated. If we did not report that as a plant in operation to the Power Commission in 1936, it seems like to me we should. Oneida has no other source of power. If we overlooked it, we made a mistake. It is not connected to our transmission system. At Jamestown it is similarly situated, not connected with the transmission, and so is Byrdstown and Selina.

The TVA is serving the municipalities of Dayton, Pulaski, and Dickson, Tennessee, and perhaps one more. I am not certain that each of them was generating its own power prior to the time the TVA started selling them power.

Redirect examination:

With respect to Complainants' Exhibit 8, setting forth the installed generating capacity, every one of those plants is capable of operating. The contractual arrangements and generating capacities of the plants are and have been sufficient to supply the Company's customers. The Railroad and Public Utilities Commission of the State of Tennessee has approved the construction of the steam plant at Nashville and it has also been approved by the regulatory commission of the State of Georgia.

(The witness was excused.)

[fol. 23] L. P. SWEATT was called as a witness on behalf of the complainants and, having been first duly sworn, was examined and testified as follows:

Direct examination:

I am 44 years old, reside in Gulfport, Mississippi, and am Vice-President and General Manager of the Mississippi Power Company. (Counsel for Defendants then conceded the qualifications of the witness.)

The map (offered and received in evidence as Complainants' Exhibit 12) shows the State of Mississippi, on which has been superimposed the transmission and distribution system of the Mississippi Power Company. The map correctly shows the location and extent of the lines of the Mississippi Power Company, but does not show the local distribution systems in the communities served by the Company which are indicated by white circles. In the upper right-hand corner is a shaded area surrounded with cross-hatching representing the area within which is located the transmission lines and properties of the TVA that were conveyed to them by the Mississippi Power Company under the contract of January 4, 1934.

With respect to the three arcs on the exhibit numbered in the margin 100, 150 and 200, the arc with the notation "Zone 1" is the area within 100 miles of Pickwick Landing Dam, the arc marked "Zone 2" is within 150 miles of Pickwick Landing Dam, and the arc marked "Zone 3" is

within 250 miles of Pickwick Landing Dam or Guntersville Dam.

The yellow lines which appear on the left-hand side of the map are the transmission and distribution systems of the Mississippi Power & Light Company. In addition to the transmission and distribution facilities owned and operated by the Mississippi Power Company and the Mississippi Power & Light Company in this area, there are 27 [fol. 24] municipally owned electric distribution systems which are shown by green circles. There is also approximately 18 miles of 13.2 kv. system owned by the Tri-County Power Company extending from Houston to Woodland, Mantee, and Montpelier which is served at wholesale by the Mississippi Power Company and is shown in a solid green line. There is also shown in broken green line a proposed system of the Central Electric Power Association which is under construction at the present time and which is to be served wholesale by the Mississippi Power Company. The Mississippi Power Company only serves one municipal operation wholesale and that is West Point.

The Mississippi Power Company has a 44,000 volt interconnection with the system of the Alabama Power Company, just east of Aberdeen, of 2,550 kilowatts capacity. It has a 110 kv. interconnection with the system of the Alabama Power Company east of West Point. That has a capacity of 25,500 kilowatts. It has a 110 kv. interconnection with the system of the Alabama Power Company east of Meridian that has a capacity of 17,000 kilowatts. It has a 110 kv. interconnection just east of Hurley with the system of the Alabama Power Company, that has a capacity of 21,250 kilowatts.

The Company has a 44,000 volt interconnection with the system of the TVA at Okolona. Prior to the expiration of the contract of January 4, 1934, the Mississippi Power Company regularly supplied the TVA system current through this interconnection. Since the expiration of that contract, breakdown service only has been rendered to the TVA at their request.

The Mississippi Power Company has generating facilities whose location is indicated on the map by red squares. The tabulation (offered and received in evidence as Complainants' Exhibit 13) shows the generating plants owned or subject to lease or contract by the Mississippi Power Company [fol. 25] pany. The three plants under the heading in the

third block of figures, "Customers' Plants", are plants owned by customers but subject to operation on call by the Mississippi Power Company at any time. Referring to the next heading, "Purchased Capacities", under which appears "Goodyear Yellow Pine Lumber Company", the Mississippi Power Company purchased from that company in 1928 the local electric distribution system at Picayune, Mississippi. There was an arrangement under that contract whereby this lumber company would operate their generating plant continuously and furnish all surplus energy to the Mississippi Power Company, and since that date we have taken such energy. This plant has a total installed capacity of 4600 kilowatts.

The combined installed capacity of the generating facilities is a total of 25,152 kilowatts. The major power requirements of the Mississippi Power Company are purchased from the Alabama Power Company at the aforementioned interconnecting points. The three plants at Waynesboro, Lucedale, and Leakville, under the heading "Isolated Plants" are operated continuously and furnish all of the current required in those local municipalities.

The steam plant at Gulfport furnishes the majority of the current for the Company's transmission system on the Gulf Coast of Mississippi. The majority of the current required for the counties of Pearl River, Lamar, and part of Forrest and Stone Counties, is secured from the Goodyear Yellow Pine Company's steam generating plant at Picayune. The plants other than those which I have mentioned are solely reserve standby plants connected to the system of the Company.

In addition to the electric power facilities which I have generally described, the Company owns the motor coach transportation system at Hattiesburg. The total gross [fol. 26] revenue from those bus operations in the year 1936 was approximately \$25,000, whereas the total revenue of the Mississippi Power Company from all sources was approximately \$3,360,000. The bus operations are under the general supervision of the same officials of the Company and consequently are interdependent.

The Company has outstanding first mortgage bonds of \$10,690,500, 39,092 shares of preferred stock and 450,000 shares of common stock.

The Company was organized on November 24, 1924. It actually began operations on January 1, 1925. Prior to

the beginning of the Mississippi Power Company, of the system as it exists today, there was a total of less than 50 miles of transmission and distribution system in the area now served by the Mississippi Power Company. There was no line over 13,200 volts. The service that was rendered was rendered by smaller private companies and municipal operations. There were a great many cities and communities that are now served by the Company that had no service at all. As a matter of fact, only 54 per cent of the cities and communities now served by us had any electric service prior to the time we gave them service.

Prior to the organization and operation of the Mississippi Power Company, there was practically no rural service being rendered, nor were there any interconnected systems for the service of electric customers in that area. These were small locally operated systems with local generating plants.

The Mississippi Power Company has a complete organization, with all of the necessary departments to carry on its business and to expand its business, and to seek more markets. It has sales and promotional organizations consisting of home lighting advisers and commercial and power [fol. 27] salesmen. It has a new industries department that aids communities in locating new industries and expanding existing industries and working for the general industrial and agricultural development of the state.

The tabulation (offered and received in evidence as Complainants' Exhibit 14) shows all of the cities and communities that are now served by Mississippi Power Company, the population of each, with the date they were acquired and whether or not they were purchased or the systems were constructed, and whether or not previously they had full 24-hour service or none or partial, and it shows the top residential rate in effect at the time of acquisition.

Since the Company began operations on January 1, 1925, it has expended for additions and betterments a total of \$13,670,416.

The tabulation (offered and received in evidence as Complainants' Exhibit 15) shows by years from the first year of operation, which was 1925, through July 1937, the mileage of transmission and distribution lines, the total number of customers served, the kilowatt-hour sales annually to those customers, kilowatt-hour sales to industrial customers from the year 1931 to date, kilowatt-hour use per residential

customer, the average revenue per residential customer, the average rate per residential customer and the total number of towns and communities served.

The tabulation (offered and received in evidence as Complainants' Exhibit 16) shows the number of customers, the total kilowatt-hours sold and the revenue from kilowatt-hour sales in the years 1933 and 1936, within a radius of 100 miles of Pickwick Dam, within a radius of 150 miles of Pickwick Dam and within a radius of 250 miles of Pickwick Dam or Guntersville Dam.

[fol. 28] The Mississippi Power Company has a total of 512 employees at the present time.

Mississippi does not have a State regulatory commission like most other states have, but the municipalities exercise regulatory powers within their territorial limits. The rural communities and counties do not exercise any regulatory powers. Neither the State of Mississippi nor the counties in that State issue franchises for operations in the respective counties. The Company does not have a local franchise in the incorporated towns of Hattiesburg, Columbia and Pass Christian, Mississippi, since these expired a few years ago, but we are operating in those towns under the statewide franchise, that is under our charter and the laws of the State. All of these three towns are outside of the 250 mile area shown by the map.

The tabulation (offered and received in evidence as Complainants' Exhibit 17) shows the various city, county and state and federal taxes paid by the Company by years from 1932 through 1936, the estimated amount for 1937, and the gross revenues for the same years.

The rates of the Mississippi Power Company for different classes of service are uniform. The Mississippi Power Company has never failed or refused to serve any of its customers or failed or refused to serve any electric power demand in the territory where it serves, wherever it has been economically feasible to do so.

(At this point it was stipulated that the record should show that the charter of the Company contains in its purpose clause this provision:

"The improvement and development of water power of rivers and streams for generating and distributing and selling electricity and electro-mechanical power for any

purpose for which electricity or electro-mechanical power is now or may hereafter be used or applied.")

[fol. 29] Cross examination:

Whether or not the Company has any state-wide franchise is more or less a legal question. The State of Mississippi does not issue any certificate of convenience and necessity and there is no Commission in the State of Mississippi. The Company is incorporated in Maine, but it is qualified to do business in the State of Mississippi. I was connected with the Mississippi Power Company on June 1, 1934, and occupied the same position then that I do now.

The properties shown in the block on the upper right hand corner of Complainants' Exhibit 12 are the properties which were sold by the Mississippi Power Company to the TVA. There was a transmission line there extending on the south from near Okolona up to Corinth, near the Tennessee border, and extending from the eastern boundary, practically the State of Alabama, and then over as far as Blue Mountain and Hickory Flat. There were some isolated properties in the group that were not connected to the transmission system.

"Q. Can you give us the total length of line?

Mr. Bemis: Just a minute. Of course we would like to object to this last as not being proper cross-examination and outside the scope of the examination in chief.

Mr. Fitts: The witness described the properties.

Judge Allen: The objection is overruled and the Court will reiterate its position with reference to cross examination. It lies within the discretion of the Court largely as to what evidence will be received on cross examination, and those complainants and the counsel for the TVA will be permitted to cross examine on matters material and relevant.

Mr. Bemis: May we have our exception on the grounds stated, and also on the grounds that the testimony is irrelevant?

Mr. R. T. Jackson: We should like also to have the privilege of submitting decisions of the Sixth Circuit on that point, which we understand to be the other way.

[fol. 30] By Mr. Fitts:

Q. Mr. Sweatt, can you tell me approximately how many miles of line were involved in that transfer?

A. I don't recall.

Mr. Bemis: The same objection and exception."

I do not recall the exact figure as to how many miles of line were involved in that transfer. It is in the tabulation which was submitted as an exhibit. The exhibit shows the transfer in 1934 of 113.3 miles of transmission and 167.11 miles of distribution lines. That is Complainants' Exhibit 15, which is a tabulation showing by years the miles of transmission line, distribution line, numbers of customers, etc., of the Mississippi Power Company, and it also shows a notation on there of the items sold to TVA in the year 1934.

"Q. Thank you. By the way, Mr. Sweatt, when was that transfer completed?

Mr. Bemis: Same objection and exception.

Judge Allen: Overruled.

A. Mr. Fitts, part of that transfer was made on February 7, 1934. At that time we turned over to the TVA the sale of wholesale current to the city of Tupelo and the several large industrial customers that we were serving within the city limits of Tupelo by a local franchise there. The remainder of those properties were transferred to TVA, I think it was, June 1, 1934.

By Mr. Fitts:

Q. Well, it is a fact, is it not, that the contract was completely executed, the properties delivered, and in operation by TVA prior to February, 1936?

Mr. Bemis: Same objection and exception.

Judge Allen: The witness may answer.

By Mr. Fitts:

Q. That is a fact, isn't it?

A. That is a fact.

Q. Now, you have broken down here in the transmission lines and distribution lines; what was the size capacity of the transmission lines?

Mr. Bemis: The same objection.

[fol. 31] Judge Allen: Overruled.

Mr. Bemis: Exception.

By Mr. Fitts:

Q. You don't need to be exact about that, if you can give me an approximation, that is, what was the capacity of the majority of the transmission lines, if you know?

A. I cannot give you that information from memory.

Q. Were those distribution lines, rural lines, or distribution systems in towns in Mississippi?

Mr. Bemis: Same objection.

Judge Allen: Overruled.

Mr. Bemis: Exception.

A. Those lines were both transmission and distribution lines and local distribution lines in towns within that area.

By Mr. Fitts:

Q. In other words, the contract did include what we might call main transmission lines, rural distribution lines, and distribution systems in the towns in the area, is that correct?

A. It included, as a matter of physical—

Mr. Bemis: The same objection.

Judge Allen: Overruled.

Mr. Bemis: Exception.

A. —of physical property within that area.

By Mr. Fitts:

Q. How many counties were included in that?

Judge Allen: May I ask counsel to give counsel an opportunity to make the objection and the Court an opportunity to rule on it?

Mr. Fitts: Yes.

By Mr. Fitts:

Q. How many counties were included in that area?

Mr. R. T. Jackson: We object.

Judge Allen: The objection is overruled.

Mr. R. T. Jackson: May an exception be noted, please?

• • • • •

[fol. 32] A. If I remember correctly, there were approximately nine counties in Mississippi included in that area.

By Mr. Fitts:

Q. Did those properties include lines serving the industrial customers?

Mr. Bemis: Same objection.

Judge Allen: The objection is overruled.

Mr. Bemis: And exception.

A. They did.

By Mr. Fitts:

Q. Did they include sub-stations?

A. They did.

Q. Did you give us approximately the total number of customers served by those properties that were transferred?

Mr. Bemis: The same objection.

A. My recollection, Mr. Fitts, is approximately 4200.

Mr. Bemis: Just a minute.

The Witness: Excuse me.

Mr. Bemis: We renew our objection to that question and understand it is overruled.

By Mr. Fitts:

Q. Do you know how many industrial customers were included?

Mr. Bemis: Same objection.

Judge Allen: The objection is overruled.

Mr. Bemis: Exception.

A. I could not state even the approximate number of industrial customers in that area."

It is a fact that there was an interconnection with the TVA and there is that interconnection now, and up until the first part of 1937, before the expiration of that contract, we regularly hauled over our system and delivered current at this interchange point to the TVA, but the Mis-

Mississippi Power Company itself, to my knowledge, never took any power during that interval from the TVA. Power [fol. 33] may have come to us over the lines of Alabama Power Company, because we have these four interconnection points with the transmission system of the Alabama Power Company, and, of course, they have an interconnection with the TVA, so it would be impossible to say where that current came to us from that system. It is a fact that we get most of our power over the lines of the Alabama Power Company. I know that the Alabama Power Company was operating under an interchange agreement with the TVA. We reported on this interchange and interconnection to the Federal Power Commission. I do not recall, however, that we reported that this power was obtained by us and given back, so to speak, to the lines of the TVA under the terms of this interchange agreement. The interchange agreement was under the terms of the contract of January 4, 1934, between the TVA and the Commonwealth & Southern companies.

If I recall correctly, there were in 1933 five municipally owned distribution plants in the territory of the Company. The TVA is now serving two municipalities in that territory, the municipalities of Okolona and Amory, Mississippi. Neither of these municipalities purchased power from Mississippi Power Company prior to the creation of the TVA. They were operating their own distribution systems and generating their own power. Outside of those two municipalities, the only municipalities being served by TVA are located along the properties that the Company sold to the TVA.

The system peak demand in 1936 and at the present time is greater than it was in 1934. As a matter of fact, it is a new high. The sales of kilowatt-hours in 1936 constituted the highest in the history of the Company, and the Company sold more electricity in 1936 than ever before, [fol. 34] but there are several reasons for that. The residential kilowatt-hour use per customer on the system has increased steadily since the beginning of the Company.

Referring to Complainants' Exhibit 12, the map shows the main transmission and distribution system of the Mississippi Power Company. They are not all of the same voltage, and there is no differentiation on the map between lines of different voltages. By looking at the map you can-

not tell whether you are looking at 110 kv. or 11 kv. One not familiar with the map could not tell whether the lines were capable of serving a municipality or a farmer, or what they were capable of serving, nor what load centers could be served from which line. It is, however, a correct map for the purpose for which we introduced it. As I said at the beginning, it is a skeleton map showing the main transmission and distribution system of the Company, where the lines are and the communities served by the Company. It is not intended to show the capacity of those lines and the amount of power available at different points, which would take a map in considerable detail.

Redirect examination:

There are three towns now served by the Mississippi Power Company that have had elections voting on the subject of the acquisition of municipal plants and systems to receive service from TVA. Those towns are Starkville, Aberdeen and Columbus.

"By Mr. Bemis:

Q. Now, in addition to these three towns, are you able to state how many other towns, if any, within this area which now have their own distribution and generating facilities, within the past three years, voted to enter into contracts with the Tennessee Valley Authority for service?

Mr. Fitts: We object to that question on the ground it is irrelevant and also a repetition.

Judge Allen: Objection sustained.

[fol. 35] Mr. Bemis: If the Court please, I would like to call to the Court's attention that this witness has testified that since 1925 the company has acquired a great many municipal distribution systems and that the development and growth of the company has been in that direction and that these towns are not only customers of the Mississippi Power Company, but it seems to us that it is material to the issues in this case to show not only those instances in which not only existing customers have been taken away, but also the effect upon the future business of the company, and potential customers.

Judge Allen: Objection sustained.

Mr. Bemis: I would like to have an exception, and want to preserve the record. May the witness be permitted to

answer the question, rather than to make the offer to prove?

Judge Allen: The objection is sustained, but the witness can make proof of what he would have testified if allowed to testify.

A. The municipalities of Okolona, Amory, Tupelo and New Albany are now receiving service from TVA. There was an election in Copinath, Mississippi, which was served by the Mississippi Power Company, to acquire the distribution system and take service from the Tennessee Valley Authority."

The growth in number of customers, kilowatt-hour sales and industrial sales from 1925 to 1929, inclusive, is comparable with the growth between 1929 and the period ending July, 1937, as shown by Complainants' Exhibit 15. That is, as to the kilowatt-hour sales. The growth during the period, 1929 through July, 1937, has been accelerated to a considerable extent due to the location of a number of major industries in the territory served by the Company, through the Company's direct efforts and due to very aggressive sales policy seeking the possible markets for power and increased usage on the part of the customers, and the resumption of some industries, due to the indirect efforts at least of the Company, that had been closed down for a considerable period.

The figures on Complainants' Exhibit 15 are correct, which show kilowatt-hour sales in 1925 of 18,952,000, in [fol. 36] 1929 of 92,307,000, and the total at the present time of 121,160,000. The rate of growth for the entire period from 1929 to 1936 has been consistent.

Recross-examination:

The average use per residential customer at the present time is 820 kilowatt-hours, and in 1929, 431 kilowatt-hours per customer. It is just about double now. During the period between 1925 and 1929, the Company acquired quite a number of local municipal systems, private systems, and then we extended our system into communities that had no service before. That was the promotional development.

The municipal elections to which I referred were elections voting on the question of issuing bonds to acquire municipally owned distribution systems and connections in some cases with the TVA. I did not participate in any of

those elections, but I have seen the ballots, and I have seen the advertising, and I have seen the news statements with reference to them and editorials, and, as a matter of fact, the engineers' report in the case of Columbus where the engineers were employed by the City of Columbus to make a report, and this states that current is to be secured from the TVA and that service is to be available at the TVA's resale rates. I do not know whether or not any of those towns have contracts for the purchase of power from the TVA. I do not know whether or not the municipal ownership people lost the election in Jackson, as Jackson is not in my territory. With reference to elections, there have been more won than they have lost.

(The witness was excused.)

[fol. 37] LAURENCE B. HOWARD was called as a witness on behalf of the complainants and, having been first duly sworn, was examined and testified as follows:

Direct examination:

I am 37 years old, am President of the Franklin Power & Light Company and am practicing law at Nashville. I have been President of the Franklin Power & Light Company since it was organized in June, 1929. The Company sells electric power in Franklin and the suburbs of Franklin, Tennessee. Its principal office is in Franklin, which is about 20 miles south of Nashville and about 80 miles north of Wilson Dam. I had a B.S. from Vanderbilt, 1920, and law degree from Yale, 1923.

The documents (offered and received in evidence as Complainants' Exhibits 18 and 19) are true copies of the orders of the Tennessee Railroad and Public Utilities Commission, one being the approval of the original franchise and the other an approval of the extension of the franchise.

The tabulation (offered and received in evidence as Complainants' Exhibit 20) is a statement of taxes paid by the Franklin Power & Light Company for the years 1932 to 1936, inclusive.

The Company buys its power from The Tennessee Electric Power Company at Franklin. We have a distribution system in the town of Franklin and a steam plant on the

outskirts of Franklin. The steam plant is of 1,800 kw. capacity, and the distribution system is about 12 miles of 2,300 volt wiring and about 3 miles of 11,000 volt wiring.

The Company does not now operate its steam plant. It is there and can be operated at any time and we did operate it up until 1935, and it could be put in operation in about [fol. 38] 4 to 6 hours time. It is kept up and maintained and is in the nature of a standby.

The Company has 1,900 shares of \$100 par value capital stock outstanding; in other words, \$190,000 capital stock. It was fully paid for in cash and nothing was sold to the Company for it and no payment made for it by services. The document (offered and received in evidence as Complainants' Exhibit 21) is a true copy of the order of the Tennessee Commission approving the Company's original charter and its amended charter and authorizing the issuance of stock by the Company.

The Company has an authorized bond issue, by that I mean authorized by the Utilities Commission, of \$100,000. Those bonds were issued to a bank to secure a bank loan which is now in the amount of \$71,000. In other words, there is a \$100,000 mortgage bond issue and it is pledged on a note of the Company to a bank to secure \$71,000. The mortgage covers the entire property of the Company. The mortgage had been approved by the Tennessee Railroad & Public Utilities Commission and also the disposition of the bonds on the bank loan. The document (offered and received in evidence as Complainants' Exhibit 22) is a true copy of the order of the Tennessee Commission just referred to.

The tabulation (offered and received in evidence as Complainants' Exhibit 23) is a statement for the years 1933 to 1936, inclusive, and for the period of 7 months starting January 1, 1937, through July 1, 1937, showing the kilowatt-hour sales, the number of customers and the gross electric revenues for those various periods.

Cross-examination.

At the present time the TVA does not to my knowledge have contracts to sell power to anybody in the territory where my Company is operating. It is not selling in the [fol. 39] territory in which I am operating, and no wholesale purchaser of power from the TVA is selling electricity in the territory in which my Company operates.

(The witness was excused.)

R. W. MATHISON was called as a witness on behalf of the complainants and, having been first duly sworn, was examined and testified as follows:

Direct examination:

I am 46 years old, reside in Knoxville, Tennessee, and am Secretary and Treasurer of the Tennessee Public Service Company. As such, I have in my custody and control all of the Company's records.

The tabulation (offered and received in evidence as Complainants' Exhibit 24) shows the tax payments of the Tennessee Public Service Company for the period of 1932 to 1936, and an estimate of the year 1937. It also includes the gross revenue of the Company for the same years, and the percentage of taxes to the gross revenue shown on the statement.

The two dists (offered and received in evidence as Complainants' Exhibits 25 and 26) show the consents and approval obtained to the assignments and issuance of franchises owned and held by the Company.

Cross examination:

I haven't got the Tennessee Public Service Company's franchise in the City of Knoxville with me on the stand. It is unlimited as to time. Its validity is more or less of a legal question.

(The witness was excused.)

[fol. 40] R. W. LAMAR was called as a witness on behalf of the complainants, and having been first duly sworn was examined and testified as follows:

Direct examination:

I am 53 years old, reside in Knoxville, Tennessee, and am Vice President and General Manager of the Tennessee Public Service Company. (Mr. Lamar's qualifications were conceded.)

The nearest TVA generating plant to the territory of the Tennessee Public Service Company is Norris Dam, about 25 miles away. That is the nearest point, and the furthest

point of our territory is probably about 75 miles from Norris Dam.

The map (offered and received in evidence as Complainants' Exhibit 27) shows the transmission lines and many of the distribution lines in the territory in which our Company serves. It is a small scale map and consequently cannot well show the distribution lines in the various towns and cities. However, these distribution centers are indicated by circles on the map. The map in general shows the extent of the territory served by the Tennessee Public Service Company.

The Tennessee Public Service Company purchases practically all of its power requirements from the Carolina Power & Light Company. It does, however, have a small hydro electric generating plant of about 150 kw. capacity near Sevierville. The Company also has a steam generating plant of about 3,000 kw. capacity in Knoxville. The small hydro electric plant of 150 kw. capacity at Sevierville operates whenever there is enough water in the stream on which it is located. The steam plant in Knoxville is kept in readiness as a standby plant in case of emergency. The total number of electric customers served by the Company as of September 30, 1937, was 33,074.

[fol. 41] The Tennessee Public Service Company, in addition to the furnishing of electric energy, operates an urban transportation system in the city of Knoxville and immediate suburbs. That is an integral part of the Company's business. The transportation system and the electric system are operated together as a unit. The transportation system produces about 21½% of the total revenue of the Company's gross revenue. The transportation system has no separate corporate existence and is operated as a department, as a unit, under my supervision.

With respect to the securities of the Company now outstanding, there are \$7,780,000 of 5% first mortgage bonds. There is outstanding 50,000 shares of no par value preferred stock which is entitled to a dividend of \$6 per share annually before any distribution can be made on the common stock. The preferred stock is cumulative. The Company has one million shares of common stock outstanding. (It was conceded that all of the securities were issued with the approval of the Railroad and Public Utilities Commission of Tennessee.)

I am fairly well familiar with the Company's operations and properties for at least the last 8 years. The Tennessee Public Service Company operates in six counties, beginning with Knox County and extending eastward. In this territory the Company has about 181 miles of transmission lines and 1,064 miles of distribution lines and serves a little over 33,000 customers. The area reached by the existing lines is in the neighborhood of 423 square miles, although that is not all of the territory available for service in its franchise territory. More than 90% of its business comes from the sale of electric service in Knoxville, Tennessee. It also serves in 6 incorporated communities [fol. 42] ties with a population of about 112,000, and 32 unincorporated communities with a population of about 11,000. The population in what we call the metropolitan area of Knoxville was, according to the 1930 city directory, estimated at about 148,000 people.

We have a New Business Department whose duty it is to endeavor to get more business, to stimulate the use of electricity among existing customers, to point out the advantages of electric service. (At this point the Court stated it would assume that these companies were working for business and that it was unnecessary to go into their promotional activities.)

From November 1, 1930, to September 30, 1937, the Company has spent for net capital additions to its Electric Department \$1,032,943.76.

The tabulation (offered and received in evidence as Complainants' Exhibit 28) shows for the years 1927 through the year 1936, inclusive, and for the 12 months ending September 30, 1937, the number of miles of transmission lines by years, distribution lines, the average annual kilowatt-hour use by residential customers, the average annual revenue per residential customer, the average revenue per kilowatt-hour sold to residential customers, the number of towns and communities served and the kilowatt-hours sold to the various main classes of customers and the total kilowatt-hours sold by the Company in those years.

All of the business of the Company is in the State of Tennessee. The Company's business is regulated by the Railroad and Public Utilities Commission of the State of

Tennessee. We have lines and facilities and capacity to serve substantially all, if not all, of the business in the territory in which we serve. There are a few customers which we do not serve. We have never refused service to any customer if it was at all feasible, economically possible to extend such service.

[fol. 43] Cross-examination:

The National Power & Light Company owns all of the common stock of the Tennessee Public Service Company except the qualifying directors' shares. I cannot state whether or not the National Power & Light Company is in turn connected with the Electric Bond and Share Company. About 85% of the preferred stock is owned by the National Power & Light Company, the rest of it is owned by the public.

I believe it is correct that the Company's energy sales, sales in kilowatt-hours, in 1936, was the highest in the history of the Company, but I would like to check that to be sure. For the 12 months ending September 30, 1937, the kilowatt-hours sold are the highest for any 12 months in the Company's history. The Company had more customers in 1937 than it ever had before. In 1936, there was the highest average annual kilowatt-hour consumption per residential customer for any calendar year previous.

The Company does not have any generating facilities, except a standby plant in Knoxville, which is a very small one. It is substantially correct to state that the Company purchases all of its power from the Carolina Power & Light Company. When I spoke of the adequate facilities of the Company, I meant that the Company has a contract to purchase power from that company and can purchase enough from them to serve the territory.

Redirect examination:

I did not mean to say on direct examination that the Company had generating facilities sufficient to supply our entire demands. The maps and data which we have here show that we are really a transmitting and distributing company.

(The witness was excused.)

[fol. 44] PAUL O. CANADAY was called as a witness on behalf of the complainants and, having been first duly sworn, was examined and testified as follows:

Direct examination:

I am 33 years old, reside in Knoxville, Tennessee, and am President of Holston River Electric Company. (Mr. Canaday's qualifications were conceded.) I have held my present position for approximately two years. The average distance of the territory served by my Company from the nearest generating plant of the TVA is approximately 75 miles.

The map (offered and received in evidence as Complainants' Exhibit 29) shows the transmission and distribution lines of the Company in the territory in which it operates, and indicates the distribution systems by circles in the communities served, with the single exception of one very small community which is not on the map.

The Company has no generating facilities. It has approximately nine miles of high tension transmission lines and approximately 98 miles of distribution lines. The Company purchases all of its power requirements from the Tennessee Public Service Company. The map does not directly show a physical connection for that purpose. It just shows the terminal point of the transmission line on the map.

The tabulation (offered and received in evidence as Complainants' Exhibit 30) shows for the years 1928 through 1936, and for the twelve months period ending September 30, 1937, the number of miles of distribution lines, the average annual kilowatt hours per residential customer, the average annual revenue per residential customer, the average [fol. 45] revenue per kilowatt hour sold per residential customer, the number of towns and communities served and the kilowatt hours sold to regular customers.

The territory served is largely rural. It has only one incorporated town in the community, about 1,590, I think, according to the 1930 census. There are eight other communities ranging in size from 60 to 1,500, and in my opinion, the facilities are now adequate to serve the community in which we operate.

The tabulation (offered and received in evidence as Complainants' Exhibit 31) shows the tax payments made for the

years 1932 to 1936, inclusive, and an estimate for the year 1937. It also shows the gross revenue of the Company for the years 1932 to 1936, with an estimated figure for 1937.

The list (offered and received in evidence as Complainants' Exhibit 32) shows the approvals obtained to the issuance of franchises owned and held by the Company.

It is a fact that the Company is regulated by the Tennessee Railroad & Public Utilities Commission. The Company does not operate in any territory outside of the State of Tennessee.

Cross-examination:

None of the securities of the Company are held by members of the general public. They are owned by the National Power & Light Company.

The City of Morristown is the largest City in the county in which the Company operates, but we do not serve that City. Morristown owns its own distribution system and generates its own power. The TVA, to my knowledge, does not have any contracts for the sale of power in the territory shown on my map, nor does it to my knowledge now sell nor are there any wholesale customers of the TVA now selling any electric power in this territory.

(The witness was excused.)

[fol. 46] J. S. PEVEAR was called as a witness on behalf of the Complainants, and having been first duly sworn was examined and testified as follows:

Direct examination:

I am 60 years old and am President and General Manager of Birmingham Electric Company. I have been engaged in the electric power business since 1901.

The Birmingham Electric Company serves the so-called metropolitan district of Birmingham, about 95½ square miles, including the Cities of Birmingham, Bessemer, Jonesboro, Brighton, Lipscomb, Fairfield, Irondale, and Tarrant City and in the immediate sections of the county. The distance from Birmingham to the nearest TVA dam at Guntersville is approximately 66 miles.

The map (offered and received in evidence as Complainants' Exhibit 33) shows the district served by the Birmingham Electric Company. The heavy lines, both solid black and dotted black, are the 3 phase 2,300 volt circuits. The smaller black lines show the 2,300 volt single phase distribution. It also shows in a general way the various cities that are served. The map correctly shows the lines and facilities indicated thereon, but it does not show all of the lines of the Birmingham Electric Company in this area. With respect to other lines, which are not shown on the map, energy is delivered to us at three different points, at or near the territorial division line, which is shown by the heavy black line, and from those three delivery points we have a very extensive network of 13,200 volt lines which serve directly all of our industrial customers and also feed the substations from which the 2,300 volt circuits run.

There is no other electric utility company operating in [fol. 47] the territory shown on this map. The Alabama Power Company operates in the territory adjacent to that in which the Birmingham Electric Company operates.

A report and order issued by the Alabama Public Service Commission (offered and received in evidence as Complainants' Exhibit 34) establishes a territorial division between the Alabama Power Company and that of the Birmingham Electric Company.

The Company has 1,050 pole miles of distribution lines and purchases all of its energy, except in the case of a possible emergency. The Company has a stand-by steam station with an installed capacity of 11,300 kilowatts.

In addition to the electric power facilities to which I referred, the Company owns and operates street railway and bus transportation throughout its territory, and a steam heating system serving a very substantial portion of the business district. All of the companies are operated as one, insofar as management and general superintendence, accounting, office building, and it is a joint operation throughout. The electric income at the present time is about 66%, transportation 33%, and steam heating 1%.

The Birmingham Electric Company has never failed to serve any existing customer nor has it ever refused to serve any electric power demand in the area. As a matter of fact, at the present time, I think our service is available to every residential, commercial and industrial consumer in our territory.

The tabulation (offered and received in evidence as Complainants' Exhibit 35) shows by years from 1927 to 1937, inclusive, the pole miles of distribution line, the numbers of customers, the total energy sales, interdepartmental energy, kilowatts used per residential customer; for the years 1932 to 1936, the average annual revenue per residential customer and the average residential rate per kilo-[fol. 48] watt hour; and the industrial sales in kilowatt hours for 1933 and 1936 and the percentage of such sales to total sales.

At the present time, the Company has 1,482 employees. The rates of the Company are regulated by the Alabama Public Service Commission. The tabulation (offered and received in evidence as Complainants' Exhibit 36) shows all tax payments by the Company for the years 1932 to 1937, inclusive. It also shows the gross operating electric revenue and the gross total operating revenue for the same years.

Referring to the memorandum attached to Complainants' Exhibit 3, showing the list of franchises owned by the Birmingham Electric Company, two of these franchises, Fairfield and Irondale, were granted directly to the Birmingham Electric Company. It was not necessary to obtain the approval of the Alabama Public Service Commission to the granting of these franchises. All of the franchises, other than Fairfield and Irondale, were granted to a predecessor company of the Birmingham Electric Company. I have personal knowledge as to the transfer of these franchises to the Birmingham Electric Company. I was one of the receivers and, as special master, sold the property and am familiar with that transaction. Both properties and franchises were sold to the Birmingham Electric Company, and the transfer of these franchises to the Birmingham Electric Company was approved by the Public Service Commission of Alabama after due notice to all of the communities affected. The date the order was submitted was April 16, 1924. The approval of the municipalities which granted the franchises was not obtained directly. All but three of the franchises were granted to the grantee, its successors and assigns. The three to which I referred were Jonesboro, Brighton, and Bessemer. The City of Birmingham consented to the transfer and assignment of the Birmingham franchise to the Birmingham Electric Company.

[fol. 49] The only municipality in which the Birmingham Electric Company operates, but from which it has obtained no franchise, is the town of Homewood. We have a franchise covering that territory, but we have no franchise from the city. The Birmingham Electric Company's predecessor, The Birmingham Railway Light & Power Company, had been operating for a great many years in that entire territory under a franchise from Jefferson County, and the Company still operates under that franchise. The county franchise is one of those listed in this stipulation.

Cross-examination:

I couldn't say what percentage of the total business of the Company comes from the Birmingham system proper, as we do not segregate it along those lines. I think it is true, however, that the business from the Birmingham part of the system within the city limits is the largest part of the business, but I cannot give any idea as to the approximate percentage of the total.

I am informed that before the City of Birmingham could own or operate a municipal distribution system it would be necessary for the question to be submitted to an election of the voters of the city. I know you did have an election down there and that the proposition was defeated. It has not been put to a vote since that time, which was about October 8 or 9, in 1933.

The people of Bessemer and Tarrant City have had elections in which they voted to own and operate a municipal distribution system. It is my understanding that their right to procure a loan and grant from the PWA is now in litigation in another court.

I don't think I have ever seen any contract between the TVA and either Tarrant City or Bessemer, nor do I know whether or not the TVA has any contract with any municipality or other customer within the area which we claim for our company. I think the closest line of the TVA is 66 miles at Guntersville, and I don't know whether any TVA transmission line is closer. I think that is the closest dam.

Two quarterly dividends on the preferred stock of the Company are at present in arrears.

(The witness was excused.)

WALTER N. FORD was called as a witness on behalf of the complainants and, having been first duly sworn, was examined and testified as follows:

Direct examination:

I am 46 years old, live in Memphis, Tennessee, and am Vice President of the Memphis Power & Light Company. (The witness' qualifications were then conceded.)

The map (offered and received in evidence as Complainants' Exhibit 37) shows all of the lines of the Company in Shelby County, with the exception of the distribution lines in the various towns and communities shown thereon. The local distribution area in the metropolitan limits of Memphis is shown by black cross-hatching and the distribution areas outside of Memphis are shown in deep yellow circles.

With respect to the generating facilities, the Company has a 54,000 kilowatt steam generating system, that is 54,000 kilowatts as indicated by the manufacturers' plate rating. It is located at Fourth and Broadway, Memphis.

The Company has interchange facilities with the Arkansas Power & Light Company at the Arkansas-Tennessee state line, and with the Mississippi Power and Light Company at the Mississippi-Tennessee state line. These facilities terminate at our Memphis substation. Those interchange points are shown on the map, with the Arkansas Power & Light Company in green lines and with the Mississippi Power & Light Company in purple lines.

In addition to the existing generating facilities, the Company purchased a site for additional generating facilities in 1930 and at that time made plans to erect a 20 to 30 thousand kilowatt steam station on that site.

The Company also owns and operates a system for the distribution of natural gas in the territory. The gas and electric business of the Memphis Power & Light Company has been not only operated, but developed, financed and managed as one operating unit, by means of which economics and savings have been made. Approximately 37 percent of the Company's revenues are derived from our gas business and about 63 percent from the electric business. A reduction or total destruction of our electric business could do nothing else but result in a larger cost to our gas department. It is difficult to answer without having the detailed figures whether the gas department in itself

could function under such conditions and we have made no such figures.

The Company now has outstanding \$17,000,000 of 5% first mortgage bonds; \$5,275,000 of 4½% first mortgage bonds; 30,000 shares of \$7 preferred stock, no par value; 32,000 shares of \$6 no par value preferred stock; and 7,200 shares of no par value common. The issuance of all of those securities has been approved by the Railroad and Public Utilities Commission of Tennessee. The Company does not operate outside of the State of Tennessee. As of July 1, 1937, there were 1,614 holders of our \$7 preferred stock, 2,190 holders of our \$6 preferred stock, or a total of 2,723 preferred stockholders. The common stock is practically all owned by the National Power & Light Company.

[fol. 52] The Memphis Power & Light Company was organized in 1922 for the purpose of acquiring and did acquire the electric and gas properties of the Memphis Gas & Electric Company, which was in receivership. Within several years thereafter, we acquired three municipally owned and operated electric systems in the towns of Arlington, Germantown and Collierville. We also acquired three privately owned and operated electric systems of the South Memphis Light & Traction Company, the Binghamton Light & Power Company, and the Millington Light & Water Company. All of these communities were in Shelby County, Tennessee.

The rehabilitation and expansion of the electric properties from 1923 through the year 1936 required capital expenditures of net \$11,064,560, and the rehabilitation and expansion of the gas and electric properties over the same period required capital expenditures of net \$13,539,045.

The Company serves Shelby County only. That is an area of approximately 801 square miles. The City of Memphis has an area of approximately 48½ square miles. Outside of Memphis there are five incorporated communities and we are serving all of them. There are thirty-six, I believe, unincorporated communities in Shelby County ranging in population from 25 up to 607, and we are serving all but four of such communities. The area outside of these communities is devoted largely to agriculture. We serve substantially all of the industries in our territory whose power requirements can be furnished by a central station, and we serve the electric service requirements of substantially all of the

commercial establishments as well as residential customers in the territory. The territory served by us ranges from 74 to 105 miles from the TVA dam at Pickwick Landing.

[fol. 53] A tabulation (offered and received in evidence as Complainants' Exhibit 38) shows the development of the Company's business and properties from the year 1924 through the twelve months ending July 1937. It shows the miles of transmission and distribution lines, the number of customers served at the end of each period, the total kilowatt-hour sales to all customers, the kilowatt-hour sales to complainants and non-complainant companies, the kilowatt-hour sales to customers in our own territory, the kilowatt-hour sales to industrial customers, the kilowatt-hour sales to residential customers, that is, the per cent of the total territorial sales, the residential kilowatt-hours used per customer, the average annual revenue per residential customer, the average rate per residential customer, and the number of communities served by years.

The Company's rates are regulated by the Railroad and Public Utilities Commission of the state.

The list (offered and received in evidence as Complainants' Exhibit 39) shows the consents and approvals obtained to the issuance of franchises owned and held by the Company.

A tabulation (offered and received in evidence as Complainants' Exhibit 40) shows all classes of taxes paid by the Company for the years 1932 to 1936, inclusive, and the estimated amount of taxes the Company expects to pay in 1937. The exhibit also shows at the bottom the gross revenues of the Company broken down between the different classes of our business and the per cent of the taxes to the gross revenue.

[fol. 54] Cross-examination:

The City of Memphis has recently held a municipal election in which it was determined that the city would either construct or acquire a distribution system. The result of the referendum also gave the city the right to operate an electric distribution system. According to the press, the city has sold \$3,000,000 of bonds to be used for that purpose. The bonds were sold on the open market and not to the PWA, but as I understand it, an allotment of \$10,000,000 was originally made by the PWA to the City of Memphis, 45 per cent of which was a free gift. Later on I understand that

that was changed to a direct grant or gift of \$3,092,000. Litigation was immediately started in the courts and is still pending. There was also litigation over the right of the city in the State Court of Tennessee, but that case has been finally determined.

I have been connected with the Company since the beginning of its business in 1923, but I have been in the utility business in Memphis since 1910. I do not know that there has been a strong movement in Memphis for municipal ownership since around 1914. On the other hand, there has not been, or we would not have been able to acquire these three municipally owned and operated systems that I just testified about in Shelby County. The officials of these three communities were very anxious for us to take over their systems and operate them. There might have been some political movement at that time and again in 1925, in the City of Memphis, to investigate the possibilities of obtaining power from Wilson Dam, but as far as any movement that was backed by the people at that time, I remember nothing of it at all.

I remember that in the terms of the original ordinance granting the franchise to my Company, the terms reserved to the city the right to own and operate its own distribution [fol. 55] system whenever they elected to. The electric franchise expires on November 1, 1952, and the natural gas franchise expires on July 1, 1958. The City of Memphis made what was purported to be an offer to buy a certain part only of our electric system. We did not consider it a fair offer; in fact, we considered that it was a threat to force us to sell our system at distress prices. They only offered to buy a part of the system at a price to be fixed by the Federal Power Commission and, had we accepted such a proposition, we would have had to sign a contract to sell the property, or that part of the property that the city wanted, at any price that might be fixed by the Federal Power Commission. We would have had to sign a contract to sell the property at any price, regardless of what it might be fixed at by the Federal Power Commission. We would have to agree to be bound by the figure that they arrived at in arbitration.

The total kilowatt-hour sales of the Company in 1936 were the highest in our history. It is not true, however, that our peak load was right up to the limit of what we could generate in 1936 and in 1937 to date, because I remember at one particular day during 1937 we pulled 55,000 kilowatts for one

hour. During that hour there were only four turbines on the line, having a capacity according to the name plate rating of 47,500. We have other units in the plant that we could operate. We have two vertical engines that could have been operated and produce at least 4,000 kilowatts additional. It is correct that in the past two years we have been generating and selling more power than ever before.

By Mr. Fitts:

Q. Getting back to this offer for a minute: Isn't it true that that offer was to purchase the whole system within the city limits of Memphis?

A. No sir. Now, let me get that straight, I am going from memory now, but the offer was to purchase our electric facilities.

Mr. R. T. Jackson: May I make one statement at this point?

[fol. 56] Judge Allen: Are you making an objection?

Mr. R. T. Jackson: Yes. I beg your pardon. If your Honor please, I want to make an objection and I want to explain the purpose of the objection if I may. I want to object on the ground that this is not proper cross examination in relation to the examination in chief, and to say that the reason I renewed that objection now, in the face of the decision adopted by the Court is, that it is conceivable that at some later stage of the testimony it might touch some matter we would not want to be foreclosed from presenting our case as we think it should be presented by reason of cross examination of defendants at a time when we think it is not germane to the examination in chief.

Mr. Fitts: I do not see how he is going to be foreclosed in any manner. He has put a witness up to testify about the properties of the company, that the only possible purpose of that is to show that this company is going to be damaged. If the testimony is not for that purpose it clearly is not relevant at all, and it cannot have any purpose. My effort is to show that these people have been faced with a legal competition and with an offer to purchase their properties, that the right of the city to build and operate has been upheld and that the city has offered to buy the property.

Judge Allen: Objection overruled.

Mr. R. T. Jackson: We take exception."

The offer was to purchase our electric system in and adjacent to Memphis, that is the way I remember the wording of the letter, eliminated certain of our transmission system. I suggest that the whole situation would be cleared up by referring to the letter.

The dividends paid by the Company to National Power & Light Company were \$100,000 in 1933, nothing in 1934 or 1935, \$480,000 in 1936, a total of \$580,000 for the years in question.

(The witness was excused.)

W. L. YODER was called as a witness on behalf of the complainants and, having been first duly sworn, was examined and testified as follows:

[fol. 57] Direct examination:

I am 43 years old, reside in Raleigh, North Carolina, and am employed by the Carolina Power & Light Company. (The witness' qualifications were conceded.)

The map (offered and received in evidence as Complainants' Exhibit 41) shows the Company's transmission system, its principal distribution systems, its generating facilities and its interconnection with other large utilities. Because of the scale of the map, it is not practical to show the rural distribution systems or the urban distribution systems. The urban distribution systems are indicated by the names and locations of the cities and towns and communities served. The map shows the companies with which the facilities of the Carolina Power & Light Company are connected. They are connected with the facilities of the Tennessee Public Service Company, the Appalachian Electric Power Company, the Virginia Electric Power Company, the Tidewater Power Company, the Lexington Water Power Company, the Duke Power Company and the Carolina Aluminum Company.

The list (offered and received in evidence as Complainants' Exhibit 42) shows the Company's generating plants with the installed kilowatt capacity of each plant. The Waterville hydroelectric plant, located on the Big Pigeon River in Haywood County, North Carolina, was constructed under license from the Federal Water Power Commission.

The document (offered and received in evidence as Complainants' Exhibit 43) is a copy of the license, dated November 23, 1926, granted by the Federal Power Commission to the Carolina Power & Light Company for the construction of this Waterville hydroelectric development, with a copy of the acceptance of the license by the Company attached thereto. The document (offered and received in evidence as Complainants' Exhibit 44) is a copy of amendment No. 1, dated March 21, 1935, to the license, together with a copy of the acceptance of the amendment by the Company. There [fol. 58] have been no subsequent amendments. The application for this Federal water power license defined and described the market intended to be served by this project as the territory in the vicinity of Asheville. The following language in the application is correct:

"The proposed use or market for power to be developed is as follows: The power plant of this project will be connected to the transmission system of the company at or near the power station and will be used in the market of the company in Western North Carolina, including Canton, Clyde, Marshall, Waterville and Asheville."

The territory described is shown on Complainants' Exhibit 41 in the western section of the State of North Carolina, in which is located Asheville, Canton and the towns in that vicinity. The Waterville development that is referred to in the license was put in operation in 1930.

The largest customer served through these hydro facilities is the Tennessee Public Service Company. For the 12 months ending August, 1937, \$916,000 was received by the Carolina Power & Light Company for selling power to the Tennessee Public Service Company.

"Q. Assuming that under the terms of the Federal Water Power Act and the terms of the Federal Power Commission license granted, the United States has a legal right to take over such hydro electric development at the end of the license period for the net investment of the company or for the then fair value of the plant, whichever may be lower, what effect, if any, would the taking over by the defendant of all or a substantial market for electricity within the radius of 100 miles of the hydro electric plant of the Tennessee Valley Authority in or near Southwestern North Carolina have upon the value at which the United States would be entitled to take over such development?

Mr. Fitts: We object on the ground the question calls for immaterial and irrelevant evidence; second, on the ground it calls for speculative and remote testimony which is based upon an hypothesis otherwise not shown in the evidence and so far as we know cannot be shown in the evidence, and calls for conclusions of the witness as to what may happen in speculative contingencies.

Judge Allen: The Court sustains the objection.

[fol. 59] Mr. Bemis: Of course, it is understood by the Court that this is a hypothetical question which we expect to connect up. Exception. May we have the witness answer the question for the purposes of the record?

Judge Allen: Suppose you try to connect it up. Wouldn't that be fairer to the Court?

Mr. Bemis: Well, you mean introduce proof as to the facts?

Judge Allen: You said you would connect it up.

Mr. Bemis: You mean to introduce—if the Court please, of course, we cannot develop the whole picture at once. Now, the question as to what may happen in the appropriation of the market involved is a matter which involves proof of a very large scope, and the question is a hypothetical question based upon the assumption that the facts which are premised will be produced.

Mr. Fitts: If I may, I would like to point out to the Court the extent and the type of the collateral inquiry that this very sort of testimony is leading us into. In order to make anything out of their contention, it would be necessary to show the amount of business that will exist at the time that the United States may elect, possibly, contingently may elect, to take over the properties; no showing that there is any such intention. It will be necessary to show the state of the art at that time, just what this particular hydro project is worth at that time. It would be necessary to go into the questions of developing new markets in the area and the possibility of new markets developing to offset anything that may be lost, and so on, and so forth.

Now, I understand that one of the fundamental rules of evidence is that if matter, even though slightly relevant to issues in the case, leads into such complicated collateral inquiries, and if materiality is so slight, that then under what Dean Wigmore calls the Rule of Auxiliary Policy, the Trial Court should exclude any such evidence simply to prevent

the confusion of the issues that are to be determined in the case.

Judge Allen: The objection is sustained.

Mr. Bemis: May we take our exception and make an offer of proof?

A. The value at which the Government would be entitled to take over the plant would be substantially depressed.

By Mr. Bemis:

Q. In your opinion, would the appropriation of the market for which this hydro project is economically useful, have an effect upon the fair value of the property?

[fol. 60] Mr. Fitts: We object to that question upon all the grounds previously stated, and upon the additional ground that it is not shown that the witness is qualified as an expert on the value of hydro electric plants and what affect their value.

Judge Allen: Are you contesting his qualifications?

Mr. Fitts: We never admitted his qualifications as a hydraulic engineer, which I think it would take to present that sort of testimony, or electrical, or any kind you want.

Judge Allen: Objection sustained."

I have been Assistant to the General Manager of the Company since 1931. I studied electrical engineering at the Virginia Military Institute, graduating with the degree of Bachelor of Science in 1915. I came with the Carolina Power & Light Company in 1916 and was assigned to the statistical and rate department. I later became head of this department. In 1931 I was made Assistant to the General Manager, which position I still hold.

(The question was then reread and the objection renewed on the grounds stated to the previous question and on the ground that the witness' qualifications to give this kind of opinion testimony were not sufficiently shown.)

"Judge Allen: The objection is sustained.

Mr. Bemis: Is the objection sustained on the ground that the witness has not satisfied the Court as to his qualifications?

Judge Allen: No; speaking for myself alone, I consider the question objectionable because you practically put the words in the mouth of the witness.

Mr. Bemis: I would be glad to reframe the question so as to avoid the objection of its being leading if I could see in what respect it was leading.

[fol. 60-a] Mr. Fitts: It is based upon an assumption in the first place that has not been established, and, so far as we know, cannot be established.

Judge Allen: The question must be considered in its context.

Q. In your opinion, Mr. Yoder, what, if any, effect would the appropriation of the market for which this hydro project is now being used have upon the value of the hydro generating facilities to which you have referred?

Mr. Fitts: We renew the objection upon the same grounds. The question assumes an appropriation of the entire market, which has not been established. It assumes that that is the only market which this project served, none of it has been established.

Judge Allen: Objection sustained.

[fol. 61] Mr. Bemis: May the witness answer the question? We preserve our exception to the Court's ruling.

A. It would substantially depress the value of the plant.

By Mr. Bemis:

Q. Assuming, Mr. Yoder, that the defendants took over all or a substantial part of the market for electricity within a radius of 150 miles of the hydro-electric plant of the Tennessee Valley Authority in or near southwestern North Carolina, what effect would that have upon the market value at which the United States would be entitled to take over the hydro-electric development at the end of the license period?

Mr. Fitts: We object to that question upon the ground first that it hypothesizes and assumes that the Tennessee Valley Authority is going to take over all or a greater part of the market within a radius of 150 miles which is not proven, and as far as I know which cannot be proven; secondly it asks for the witness' opinion upon the value of a hydro-electric project. We are not satisfied he is qualified to express that opinion. Third, it calls for his legal conclusion as to what a fair value is.

Judge Allen: Objection sustained.

Mr. Bemis: I would like to correct the question to meet the Court's objection. I would like to have market value substituted for value or fair value. I do not assume that affects the Court's ruling.

Judge Allen: No.

Mr. Bemis: We reserve our exception, and the witness may answer.

A. It would depress the value of the plant to a greater extent than if the market was taken within a radius of 100 miles.

• • • • •
By Mr. Bemis:

Q. Mr. Yoder, assuming that the defendants take over all or a substantial part of the market for electricity within a radius of 250 miles of the hydro-electric plants of the Tennessee Valley Authority in or near Southwestern North Carolina, what effect would that have upon the market value at which the United States would be entitled to take over such hydro-electric developments at the end of the license period.

Mr. Fitts: We make the same objection interposed to the previous question and add this additional ground, that there is no evidence to show that the United States intends to take the project over.

Judge Allen: Objection sustained.

Mr. Bemis: We may have our exception and the witness' answer.

[fol. 62] A. It would still further depress the market value of the development.

• • • • •
Judge Martin: Mr. Bemis, the original question asked, out of which ensued objections and follow up questions assumed certain facts which the Court do not think have been proven in the record, and applying the hypothetical question rule we therefore, on one basis or one ground sustained the objection. Then we sustained further on other grounds. Now, so that you may be advised that that was an important basis of sustaining the objection, if your evidence introduced ultimately in the record will prove all the facts that you

assume in the hypothetical question, then of course you could present the matter to the Court. And if other objections may be deemed competent, so that there shall be no confusion in your mind, that was the point in the Court's ruling on the first question, also other grounds.

.

By Mr. Bemis:

Q. Assuming that the Tennessee Valley Authority should take over all or a substantial part of the market for electricity within a radius of 100 miles of its hydro-electric plant in or near Southwestern North Carolina, to what extent, if it did, would that deprive the Carolina Power Company of the markets which the hydro-electric development for which the Federal Power Commission issued license was constructed and intended to serve?

Mr. Fitts: We renew our objection to that question upon the grounds stated before and upon the additional ground that this project was constructed for the purpose of serving a particular market that may be taken, and for none other, and there is no evidence that shows that in the record.

Judge Allen: Objection sustained.

Mr. Bemis: Exception and the witness will answer, please.

A. It would take away the market for which the plant was constructed."

With respect to the other generating facilities listed in Complainants' Exhibit 42, the possibilities for enlargement are as follows. The Blewett Hydro Electric Plant is capable of being enlarged by 50,000 kilowatts and the Cape Fear Steam Electric Station can be enlarged by 30,000 kilowatts by the addition of a topping turbine. The Company owns the dam site and flowage lands for what is [fol. 63] known as the Buchanan Shoals Development lying in North Carolina between its Tillery and Blewett Hydro Developments. The estimated installed capacity of this development is about 40,000 kilowatts.

In addition to the electric power facilities to which I have referred, the Company owns bus transportation systems in Raleigh, N. C., and Asheville, N. C. These bus systems contribute less than 4% of our gross revenue.

The outstanding securities of the Company are \$46,000,000 par value of bonds, 165,162 shares of \$6 and \$7 non-par preferred stock, and 2,500,000 shares of non-par common stock.

The map (offered and received in evidence as Complainants' Exhibit 45) shows the western part of North Carolina and a part of the eastern sections of North and South Carolina. The territory within a radius of 100 miles of Fontana dam site is designated as Zone 1.

Examination by the Court:

The Fontana dam has not been authorized or built. It has been applied for.

"Mr. Fitts: If I may give the information which is shown in the pleadings, Congress has refused to appropriate the money for the construction of the dam.

Mr. R. T. Jackson: Our testimony will show that it is part of the present recommended construction program of the Tennessee Valley Authority."

[fol. 63a] Direct examination continued:

The map shows the Company's transmission systems in those respective areas, the towns and communities in which the Company has local distribution systems, the lines connecting these local distribution systems to the Company's transmission facilities, the rural lines of the Company and the areas covered, and the locations of Norris dam, Fowler Bend dam and Watts Bar dam. The arcs that appear on the map are drawn with a radius of 100, 150 and 250 miles from Fontana dam site. If you used Norris dam and Fowler Bend dam each as a center for the 100, 150 and 200 mile zones and made the circles from those points, the area shown in the present Zone 1 would be substantially the same as it now is. The principal difference would be in Zone 3, which would embrace slightly less territory. The locations of those points are correctly shown, so it is possible from this map to make a calculation as to the areas which would be embraced in those respective zones if other centers had been used.

"Mr. Fitts: We object to the map in its present form for the reason that it is shown affirmatively that it is incorrect and misleading. The fact that you can re-draw these circles

so as to make it speak the truth, in my opinion does not save the map from the objection of incompetency because it shows a dam on there that not only is not under construction, but that cannot be constructed unless we speculate on what Congress is going to do in the future, because it has already directly refused to permit its construction in its last action. Under those circumstances I think the map ought to be redrawn to speak the truth.

Judge Allen: The Court considers that the map is competent, that it may be received in evidence, but that it is very inaccurate. Speaking for myself alone, when I see "Dam" on a map, I think that there is a dam there, or under construction, or one to be built.

Mr. Jackson: That is unfortunate,——

Judge Allen: It is unfortunate and natural.

[fol. 64] Mr. R. T. Jackson: I don't mean to argue with the Court about that. I just want to make this statement to clarify our position: Our testimony which follows this formal proof, and we necessarily tried to put in as much as we could with these witnesses instead of recalling them, will show exactly what the Tennessee Valley dams are, what are under construction, what have been constructed, and what they have recommended for construction. Our contention is going to be that it is not limited as to what is constructed or under construction, but it extends at least if not beyond to that which we have at least a reasonable apprehension that they are doing to construct. We are suing here for anticipatory relief and not to recover damages for past actions.

Judge Allen: The map may be admitted."

In addition to the lines shown on the map, the Company owns and operates smaller rural lines which are not shown on the scale. The Company operates in its western division, which embraces nearly all of the territory shown in Zone 1, approximately 200 miles of rural lines and in the area within the radius of 250 miles of the Fontana dam site, approximately 1,200 miles of rural lines. The Carolina Power & Light Company now serves all the electric power demands in the service area in which it operates that are economically serviceable.

The tabulation (offered and received in evidence as Complainants' Exhibit 46) shows the annual kilowatt-hour sales for the years 1933 and 1936 of the Carolina Power

& Light Company. The first column shows the total sales, including sales to other companies. The second column shows the total sales of the Company to regular customers in the entire area served. The third column shows the sale to regular customers only in an area within 100 miles of the Fontana dam site. The fourth column shows such sales within an area of 150 miles of the Fontana dam site. The last column shows sales to regular customers only, in an area within 250 miles of the Fontana dam site. In addition, sales to all classes of customers are shown for the years 1933 and 1936, sales to industrial customers in an area within 100 miles of the Fontana dam site and the area within 150 miles of the Fontana dam site.

The revenue for the year 1936 in the area within 100 miles of Fontana dam site, from regular customers is \$1,591,976, which does not include power sales to the Tennessee Public Service Company which amounted to about \$900,000.

The Carolina Power & Light Company was organized in April, 1926, and at that time it served 153 communities, [fol. 65] with a total of 58,541 customers, and had 2,869 miles of transmission and distribution lines. The installed capacity of generators was 88,610 kilowatts. As of the end of the year 1926, the constituent companies of the Carolina Power & Light Company sold 284,133,834 kilowatt-hours. Ten years later, as of the end of the year 1936, the Company served 267 communities, with a total of 83,836 customers and 6,234 miles of transmission and distribution lines. It had an installed generating capacity of 249,050 kilowatts. Sales to regular customers of the Company during the year 1936 were 536,521,801 kilowatt-hours. During the ten year period, the Company extended service to 97 communities which had no previous service, and to a great many other communities having part time service, while that of the Carolina Power & Light Company is continuous and adequate to take care of the demands of any customers for expansion. The Company never has refused to give service to any customer on account of the inadequacy of facilities.

The Company's system is connected with that of the Tennessee Public Service Company on the North Carolina-Tennessee state line, near the Waterville plant, which is just across the line. There are two lines running from this

plant, one of which extends towards Knoxville. The capacity of this interconnection is 50,000 kilowatts. The other line extends towards Kingsport, Tennessee, with a capacity of 60,000 kilowatts.

The Company's facilities are connected with those of the Appalachian Electric Power Company on the North Carolina-Virginia state line, near Danville, Virginia, with a capacity of 40,000 kilowatts.

The Company's facilities are connected with those of the Virginia Electric and Power Company, near Roanoke Rapids and Battleboro, N. C. The capacities of those interconnections are 30,000 kw. and 6,000 kw. respectively.

[fol. 66] The Company's facilities connect with those of the Duke Power Company at a point midway between Raleigh, N. C., and Durham, N. C., with a capacity of 15,000 kw.; at a point near the Narrows substation, near the Baden plant of the Carolina Aluminum Company, with a capacity of 30,000 kw.; near Greenville, S. C., with a capacity of 20,000 kw.; and at the Wateree plant of the Duke Power Company, with a capacity of 28,000 kw. The Company's facilities connect with those of the Tidewater Power Company at Mount Olive, N. C., with a capacity of 1,500 kw.; at Abbottsburg, N. C., with a capacity of 1,500 kw.; and at a second connection at Abbottsburg, with a capacity of 12,000 kw. The Company's facilities connect with those of the Lexington Water Power Company at the Saluda plant of that company, with a capacity of 50,000 kw.; with those of the Carolina Aluminum Company near its Blewett plant, with a capacity of 40,000 kw. All of our interconnection capacities are only approximate. The Company has constructed generating and transmission and distribution facilities to keep ahead of the growth of the market and has endeavored not to over-construct facilities which would result in an increase of the cost of service.

The tabulation (offered and received in evidence as Complainants' Exhibit 47) shows by years, for the period beginning with 1927 and extending through 1936, and also for the year ending July 31, 1937, for the Carolina Power & Light Company, the number of miles of line of 35 kv. and above, miles of line of less than 35 kv., number of customers, residential annual kilowatt-hour use per customer, average annual revenue per residential customer and average rate per kilowatt-hour for residential customers. It

also shows the number of towns and communities served by the Company.

As of August, 1937, we had 1,434 regular employes and 57 temporary employes. The rates of the Company are [fol. 67] regulated in North Carolina by the North Carolina Utilities Commission, and in South Carolina by the South Carolina Public Service Commission. The rates are uniform throughout the territory served for the same class of service.

The tabulation (offered and received in evidence as Complainants' Exhibit 48) shows the tax payments of the Company for the years 1932 to 1936, inclusive, with an estimate for the year 1937. The statement shows, in addition to the amount of taxes paid, the gross electric revenue from the sales of energy, and gross revenues, including non-operating and other income.

Cross-examination:

The TVA does not at the present time have any transmission lines within any of the territory that we claim on these maps, nor does it have any contracts for the sale of power to any customers located within any of that territory. The TVA is not serving nor is any wholesale customer of the TVA serving anywhere within that area.

The gross revenues from the entire business for the year 1936 from electric service were \$10,521,730. The revenue from the Knoxville business would be substantially \$916,000. We have given considerable study to the Knoxville situation, but I cannot tell you what steps are involved and what would have to be done before we lost our Knoxville business. I do not know whether the City of Knoxville would first have to get itself a distribution system. Knoxville has not yet got its own distribution system. The next thing that would have to be done before we could lose this business would be that the power to the City of Knoxville would have to be supplied from another source. Our loss is contingent upon the happening of these contingencies. We are not exactly assuming that the Tennessee Public [fol. 68] Service Company is going to withdraw from business in Knoxville or lose all of its business to the City distribution system, but we would sustain a loss if the TVA or the City competed with the Tennessee Public Service Company. There is no certainty that we would lose the

entire Knoxville business, but we have been unable to renew our long-term contract with the Tennessee Public Service Company for the sale of power to it on account of the activities of the TVA in Knoxville, so that we are now operating on a ninety-day basis instead of on a long-term contract. Furthermore we have been serving the Tennessee Public Service Company their entire requirements with the exception of what they generated with a small plant. They have in turn been serving the Volunteer Portland Cement Company. They have been advised that they are going to lose that business as of January 12, 1938. The Tennessee Public Service Company is going to lose that, so that we will then lose a certain part of our revenue because of the fact that the Tennessee Public Service Co. will not have to supply the Volunteer Portland Cement Company.

"Q. Now, to sum your testimony up, isn't this correct, the Knoxville business is about 7 percent of your total gross business. There are no lines now in your territory, there are no contracts, no service anywhere within your claimed territory. You are testifying to a possible loss of 7 percent of your total business, and that loss, even you cannot say is a certainty, isn't that true?

Mr. Bemis: We object to that question. The witness has not testified that it represents 7 percent.

Mr. Fitts: I am cross examining. I am asking you whether it is true or not.

Mr. Bemis: It is purely argumentative.

Judge Allen: Objection overruled.

Mr. Bemis: Exception."

I am testifying that sales to the Tennessee Public Service Company were \$900,000, which is approximately 8% of the Company's total gross revenue, which, of course, is a substantial amount of money, and that we stand to lose a part [fol. 69] or all of that revenue by reason of the activities of the TVA in Knoxville, Tennessee, at the present time. That is by reason of the City of Knoxville owning and operating its own distribution system and purchasing power at wholesale from the TVA. But I cannot see the difference between our losing the business by reason of Knoxville deciding to operate a plant of their own, assuming that that decision of the City of Knoxville must

have been on account of the availability of the TVA power, and having the TVA itself operate the system in Knoxville. So far as we are concerned, our loss is just as definite. I did not say that TVA is going to operate any system in Knoxville. I said I could not see the difference, so far as our loss is concerned, whether the City of Knoxville decided to operate a distribution system of their own with TVA power or whether the TVA itself operated the distribution system in Knoxville. If we lost this Knoxville contract to supply power to the Tennessee Public Service Company, we would certainly try to find other sources for disposing of that power. It is possible that we might do it.

We have first mortgage bonds outstanding but no second mortgage bonds, but there is a priority between the bonds outstanding. I could not tell you what has been the trend in the list prices of these bonds from 1933 up to the present time, as I do not know. Nor could I tell you whether your figures are right.

It is a difficult question to tell how far our present lines transmit power from our own generating plants. We do own a line that transmits it more than 100 miles from the place where it is generated. We transmit power, we take it from the Appalachian Electric Power Company on the North Carolina-Virginia state line clear across the state. That is not power that we generate ourselves, I was just showing the distance. We generate power at our Tillery plant, which is near Rockingham, N. C., and take that power as far north as Henderson, which is about 150 miles. We [fol. 70] generate power at the Blewett hydro-electric station and transmit that power as far south as Manning, S. C., which is a distance of about 170 miles. I think that is about the maximum distance of our own generated power. Those two lines are not the only ones of over 100 miles in length transmitting power from our generating plants. I was just taking the farthest distance away from the plants. The plants are more or less in the center of the system. I was just taking the distance from these plants to the remotest areas of our own system. There are not any of our own generating plants or sources of power along that 150 miles of line. There is other power fed into that line as it goes along, which makes a lot of difference. I don't think we have any lines over 100 miles in length that transmit power from the place where it is generated with-

out any relaying and without having any additional power fed into it. I would not say definitely that we don't have any, because I cannot tell just from looking at the map right off hand. I would say that we have some of such lines over 100 miles in length but not over 150 miles in length.

It makes a difference in the amount of territory whether you take circles of 100, 150, 200 or 250 miles. It also makes a difference in the amount of customers. It does not make a great deal of difference whether you take the Fontana dam or the Hiwassee dam in the number of customers.

With reference to Complainants' Exhibit 46, it is true that we have more customers in the area between 150 miles and 250 miles from Fontana dam than is in the area of 50 miles from Fontana dam. A large part of the business is in the outside belt away from the Fontana dam. If you draw your circle from Norris dam and Fowler Bend dam, you would take in within a 100 mile radius practically the entire western division. You would take in somewhat a less portion of Zone 3 with a 250 mile radius. Our business [fol. 71] is larger in Zone 3 than in Zone 1. We would get considerably less of it in, if we started this from the other place. The maps were drawn by engineers, but I told them what dams to put in and what radii to use. The Fontana dam was put in because it was the nearest one to our territory and showed the most. I did not make any assumptions as to the way in which Norris and Hiwassee dams are going to be operated. It is very evident that there will be sufficient power from these two developments to take care of the load in that territory. I would assume that you would operate in such a way that you could take care of that load, that you want to get it. My assumptions were not based upon any method of operation, because my computations just show in the areas indicated what we have. We are able to serve customers in Zone 3, which is about 200 miles from our Waterville hydro-electric development, with power relayed from Waterville.

Redirect examination:

The nearest point in our system from the three dams or dam sites shown on Complainants' Exhibit 41 is approximately 75 miles. I have seen in the papers that the City of Knoxville has advertised for bids for the construction

of a distribution system in Knoxville. I only know what I read in the papers about it. That is my source of knowledge. I have not received any assurance that the TVA will not sell or distribute power in our territory. It is my understanding that all of these dams which have been referred to in cross examination by counsel for the defendants are to be interconnected and to make up one great system. I also understand that the power from this one pool can be tapped at any point on the system.

[fol. 72] Recross-examination:

The Tennessee Public Service Company owns the transmission line over which the power is sold in the City of Knoxville.

(The witness was excused.)

[fol. 73] N. M. ARGABRITE was called as a witness on behalf of the complainants and, having been first duly sworn, was examined and testified as follows:

Direct examination:

I live at Pelham Manor, New York, and am 57 years old. I am the Operating Vice President of the Appalachian Electric Power Company, the Kentucky & West Virginia Power Company, Inc., and Kingsport Utilities, Inc. I have been in the electric utility business since 1899, 38 years, and have been with the Appalachian Company since it was organized in 1926.

The map (offered and received in evidence as Complainants' Exhibit 49) shows the facilities of and the territory served by the Appalachian Electric Power Company, the Kentucky & West Virginia Power Company, Inc., and the Kingsport Utilities, Inc. The colored portions of the map show the broad outlines of the territory served by these three companies, except for minor areas served by non-affiliated companies.

The three arcs of circles appearing on the map represent three radii centering at Norris Dam, spanning 100 miles, 150 miles and 250 miles. It is impossible to show all of the lines of those three companies on a map anywhere near as small as this map. I have reference to distribution

lines, and there are farm lines and rural extensions which would not come out on a map like this.—

These companies all own generating facilities. The tabulation (offered and received in evidence as Complainants' Exhibit 50) shows the Appalachian Electric Power Company's installed generating capacity, both steam and hydro. It also shows purchased capacity. I might explain that by "purchased capacity" I refer primarily to the output of [fol. 74] the Kanawha Valley Power Company, which is purchased and contracted for by the Appalachian Electric Power Company for the period of the life of its federal license.

The tabulation (offered and received in evidence as Complainants' Exhibit 51) shows the installed steam generating capacity of the Kentucky & West Virginia Power Company, Inc. The tabulation (offered and received in evidence as Complainants' Exhibit 52) shows the installed generating capacity of the Kingsport Utilities, Inc.; and the tabulation (offered and received in evidence as Complainants' Exhibit 53) shows on one sheet, the installed overall generating capacity of all three companies. They are closely interwoven.

None of these three companies owns or operates any properties other than electric properties.

The Appalachian Electric Power Company has outstanding bonds in the amount of \$80,774,000, and preferred and common stocks in an aggregate amount of \$53,500,167.27. The Kentucky & West Virginia Power Company, Inc. has outstanding bonds in the amount of \$8,499,000, and preferred and common stocks in the amount of \$4,147,525. The Kingsport Utilities, Inc. has outstanding bonds in the amount of \$1,044,000, and preferred and common stocks in the amount of \$1,000,000.

The chart (offered and received in evidence as Complainants' Exhibit 54) shows the development of the interconnection and coordination of the properties of the Appalachian Electric Power Company, the Kentucky & West Virginia Power Company, Inc., and the Kingsport Utilities, Inc. It shows by steps the construction of the 132,000 volt integrated transmission network and the interconnections with affiliated and non-affiliated systems. The exhibit [fol. 75] starts in the winter of 1925-26 and closes after 1935. This system as put together was planned in advance.

It was not a thing which just grew. It was planned just the way it came through. Prior to 1925 the getting together of the properties that would be necessary to support an integration of this kind took place. I mean by that, some of the predecessor companies, as well as the Appalachian Company when it was organized in 1926, got ready to develop a full integration and to tie in with neighboring companies and to make available to the communities covered by this wide area modern electric service which was not obtainable by any of them at that time. We started in and first conceived of taking a line from Logan, West Virginia, into Turner, West Virginia, in order to bring a supply quickly into Charleston, West Virginia, which was very short on capacity and on service at that time. That was finished as shown by Step 2 in the spring of 1926. In the spring of 1926 we projected a line into Rutland from Turner to tie in with the Ohio Power Company and work an interchange with that company. Going on to Step 4, in the summer of 1926 we gave relief to the City of Lynchburg, which was growing very rapidly. We started also from Roanoke down to Glen Lynn to tap another source of supply into that territory to relieve both Roanoke and Lynchburg and the territory they were supplying. The further development of the steps is graphically shown in this Exhibit 54 which can be read as you run.

A system that is built and designed to do a certain thing and to meet certain complicated conditions that arise in a great territory of that kind, when it is upset or disturbed by disintegration, falls out of balance very badly. Conditions become badly disturbed, not only from an operating standpoint, but from a financial standpoint.

[fol. 76] The tabulation (offered and received in evidence as Complainants' Exhibit 55) shows the number of customers, sales and revenue of Appalachian Electric Power Company within the zones at varying distances from Norris Dam. On the left is the 100-mile radius, next the 150 and then the 250. On the right hand side of the exhibit is a thing that I believe should be pointed out, and that is on the third column, the second column from the end, there is shown the total sales to regular customers in kilowatt-hours, and the one previous to that is the sales to large light and power customers, or the industrial sales of the Company. I call attention to those figures because of the fact that this power company is primarily an industrial

supplier. It supplies a very, very large industrial area. The tabulations (offered and received in evidence as Complainants' Exhibits 56 and 57) show the same information for the Kentucky & West Virginia Power Company and the Kingsport Utilities, Inc.

The tabulation (offered and received in evidence as Complainants' Exhibit 58) shows the Appalachian Electric Power Company's transmission and distribution lines as of different dates, beginning with 1928 and coming down to July, 1937. It gives the pole miles of lines with voltages ranging from 22 kv. to 132 kv., pole miles of lines below 22 kv., and the total pole miles of lines. There is a summation for the 100-mile zone, for the 150-mile zone, and for the 250-mile zone. The meaning of those zones is indicated by the footnote on the exhibit. The tabulations (offered and received in evidence as Complainants' Exhibits 59 and 60) show the same information for the Kentucky & West Virginia Power Company, Inc. and the Kingsport Utilities, Inc.

The tabulations (offered and received in evidence as [fol. 77] Complainants' Exhibits 61, 62 and 63) show certain data with reference to towns and communities served, average use, etc., for the three companies.

The Appalachian Electric Power Company on August 31, 1937, had 3,366 employees. The Kentucky & West Virginia Power Company, Inc. had 435, and the Kingsport Utilities, Inc. had 98. Out of the Appalachian and Kentucky employees there are 47 men who overlap who work for both companies, back and forth across the boundary line, across the river.

The rates of the Appalachian Electric Power Company are regulated by the State Corporation Commission of Virginia and by the Public Service Commission of West Virginia. The Kentucky & West Virginia Power Company, Inc. operates only in Kentucky and its rates are regulated by the Public Service Commission of the Commonwealth of Kentucky. The rates of the Kingsport Utilities, Inc. are regulated by the Railroad & Public Utilities Commission of Tennessee.

These companies primarily and very largely ask their large power customers to sign only a one-year contract for service, which contract is automatically renewable from year to year unless notice is given 60 days prior to the expiration of a given year. We have some customers that

have been allowed to sign up for a longer period of years, where we have had a heavy investment in getting them. That gives us a guarantee of a certain time in which to absorb the expense, whatever it may be, in getting the service to a particular customer. We have some contracts running around five years, things of that kind, but our wholesale-large power business is done on what you might call a "good behavior" basis. In other words, we have always got to serve them upon a basis upon which they are thoroughly satisfied in order to serve them, and not on a binder of a contract. We have never had any trouble in [fol. 78] retailing customers of this character once they are on our lines. Our system is built specifically and especially for that kind of service.

The Appalachian Electric Power Company had completed, up to August 31, 1937, 2,527 miles of rural lines, and had under construction 452 miles. The Kentucky company had completed 131 miles and had under construction 31 miles. The Kingsport Utilities Company had completed 49 miles and had 6 miles under construction.

The map (Complainants' Exhibit 49) shows three zones measured by a radius from Norris Dam. In the territory served by these three companies within a 100-mile radius of Norris Dam, there is a very small amount of load not now served by these companies that could be considered prospective. In the territory served by the Kingsport Company, which is all within the 100-mile zone, there is not more than 100 kw. of prospective unconnected load. There is none that I know of in the territory within the zone served by the other companies. There is, of course, more than 100 kw. of unconnected load. However, the nature of the manufacturing processes makes this load impossible to be connected by a public utility. They manufacture their energy through the process steam that they have to use for other purposes. Most of the Appalachian system is within the 250-mile zone and there is less than 10,000 kw. of load that we consider as prospective. Here again, as pointed out in the case of the territory served by the Kingsport Company, there is considerable additional unconnected load that cannot be considered prospective on account of the conditions under which they operate—chemicals and paper manufacturers and things of that kind, where they use process steam. There is considerable 25-cycle load, railroad electrification, and things of that

kind in the territory, which we do not consider as available [fol. 79] prospective. They cannot be served from a 60-cycle central system to any advantage. There is very little unconnected load in the Kentucky territory in the 250-mile zone. We have a continual inflow of new load coming from the industrial territory right along, and the residential load follows the industrial, of course. It just continues to come. Even if we had these prospects cleaned up, it would continue to come.

The tabulations (offered and received in evidence as Complainants' Exhibits 67, 68 and 69) show the tax payments for the years 1932 to 1937, inclusive,—1937 estimated—for the Appalachian Electric Power Company, Kentucky & West Virginia Power Company, Inc., and Kingsport Utilities, Inc., respectively.

The tabulation (offered and received in evidence as Complainants' Exhibit 70) shows approvals by the Tennessee Commission of franchises owned and held by Kingsport Utilities, Inc. and consent of the City of Kingsport to the assignment of the franchise issued to a predecessor company. The Kentucky Commission came into existence in 1934. No consents were required by any similar body in Kentucky before that time. The Kentucky & West Virginia Power Company, Inc. has one franchise in Leslie County which we obtained since the Kentucky Commission was organized and we have an approval of that franchise. The original franchise at Kingsport was granted before any consents were required by the state regulatory body under the laws of Tennessee.

I believe there are four small municipal plants in the Appalachian territory which are taking service from the Appalachian Company, and I believe there is one that does not take any current from the Appalachian Company. That is the City of Radford, Virginia. The others that are taking current are the towns of Salem—incidentally, in [fol. 80] the town of Salem the Company supplies the power there direct, so it is only partially a municipal proposition—the town of Bedford, where they have a small hydro plant, and where we supplement their supply for them; the City of Martinsville is in the same condition, and the town of Richlands. In Kentucky there is the City of

Olive Hill, which takes its entire output from the Kentucky & West Virginia Power Company, Inc. I think that covers the municipal operations. There are none of them of any great size, however.

[fol. 81] Cross-examination:

The TVA does not, to my knowledge, have any transmission lines within the area that I have described as the area claimed by these three companies. I do not know of any service being rendered either by the TVA or by any wholesale customer of the TVA to anyone within that area. Since the organization of the TVA, the three companies concerning which I testified have been following through their regular process of putting in new generating capacity as fast as it is needed. It is still being added. We added 40,000 kw. at Logan, West Virginia, in 1937, or are in the process of adding.

I did not overlook the municipal plant at Danville, Virginia, that generates its own power. I think that the question asked me was in the territory. I think if you will look at the map you will find that there is a space left vacant for Danville. They generate and distribute their own power, but that is not in the territory that we have colored. The town of Martinsville generates its own power. I guess I did not read that. I had it in front of me. But we are connected with them and supply part of their supply.

In 1935, we leased two licensed Government dam sites, both London and Marmet; 18,000 kilowatts at Marmet and 16,500 at London. Both of those dams were constructed by the United States engineers. It is not quite right to say that this year we have leased an additional 21,000 kilowatts at the dam constructed by the United States engineers at Norfield. It is built by the Kanawha Power Company, the same as the other, and the lease is understood to be coming through. It is true that if we conclude that lease, we will have added approximately 95,000 kw. to our existing power during the last two years. I should also say that this addition represents about one-fourth of our installed capacity. The Company is now constructing a [fol. 82] hydro-electric dam on New River, near Radford, which is within the 250 mile radius. That will be 75,000 kilowatts.

In computing the non-connected load in the area claimed by the three companies I have discussed, I included farms

and small rural communities in the area not now served. I speak of the reasonably prospective load. By that I mean if a man is operating a pulp mill by which he has to use steam in order to do his processing, and that steam is capable of being used to generate energy before going into the process, we do not believe that is a reasonably prospective load. We do not believe a railroad generating power using 25 cycles is a reasonably prospective load. The conversion load in those instances is too great for the railroad. We count every farm that has the apparent ability to pay for the use of electric energy as a part of our reasonably prospective non-connected load. There are such things as farms which we have in the mountains of West Virginia and Virginia, cabins where nobody would ever buy current if it was given them at any price.

It is not true in considering this non-connected prospective load that we first have to figure whether in any given area there is enough demand to justify us in building transmission lines to pay our profit. I will tell you about how those things are done in West Virginia, as an example, and will also tell you how it is in Kentucky. The rural electrification in West Virginia is laid down by the Commission's formula. The formula provides regular ways for prospective users to secure the current. They can come in and apply for service in the area where it is not now served, and if they can comply with the formula, they get the service.

In Kentucky, the entire area shown on this map has been handed over to this company under a certificate of convenience and necessity, which subjects us to go anywhere in that area in taking care of the business. We are now calculating on filling up all of the gaps in that area. In estimating the future load, we fully expect the possibility of new industrial customers coming into the region, but have not calculated this expansion in the figures I was using. We are expecting that today, but it may come at a later time.

Our load center which is nearest to the nearest source of TVA power is Kingsport, Tennessee, which is about seventy miles from the TVA power pool, that is, seventy miles from Norris Dam. I have heard most of the testimony here and have heard two or three of these companies say that Norris Dam is the place from which they are drawing their distances. There is some limitation on the base load that can be served from the Norris plant over a transmitting

distance of 100, 150 or 250 miles, but I am not at all sure that the people that are running Norris Dam are cognizant of those things.

Examination by the Court:

The limitation on the base load depends on the formula against which you are working. You have to take into consideration when you push a line out anywhere, first, the law of economics. You have to take into consideration what regulation you can give on long lines, pushing out from anywhere. If you push a line 250 miles, we know from experience you are going to have a tremendous job regulating it at the end of 200 miles unless you have built under extremely extravagant conditions. We know that economic conditions have to be very favorable and you have also to take into consideration the question of load factor to a very considerable degree. The load factor controls that much more than any other factor you can bring into the picture. These things have to be taken into consideration. We know, as far as we are concerned, that we have very [fol. 84] extensive limitations as to how far we can push a line out and get a load, because we have to meet the laws of economics. Particularly on account of the facts and conditions under which we operate, we cannot do things which will not carry from a financial standpoint. As far as profit is concerned, we do not consider that we work for a profit. We consider we work for a return upon the investment in the property.

Cross-examination continued:

It depends very largely upon how you build your pool as to whether all of this territory which has been described, both in my testimony and in the preceding testimony, could be served over lines the distance they will have to go from Norris Dam. If your pool is sufficiently reinforced, and every fifty or sixty miles you have another generating station pumping current back into the Norris section, if you are fortified with sufficient transmission to get it there—

“By Mr. Fitts:

Q. Do you know of any generating station between Norris Dam and the points that have been mentioned in your testimony and the other testimony?

A. I only know that you have a very large pool under calculation and a pool of 660,000 to 1,000,000 kilowatts with no place to go is a very threatening piece of business to look at from our standpoint."

When I talk about a pool, I am talking about interconnection of the dams. I cannot agree that that has nothing to do with the question as to whether or not the base load limitations at Norris are not so great as to make impossible the kind of service that has been testified to here over the area that has been testified to. I cannot agree that you are going to cut Norris Dam off and say what can be delivered from Norris Dam is fundamental. What can be delivered from that pool is the fundamental question.

[fol. 85] It is correct that there is a pool and an interconnection of all of the dams on the main river. There are, of course, limitations as to how far you can transmit power from the Norris generating plant, which is the nearest, without a break and without putting any more power into the line as it goes out at any place along the line. There are very decided limitations, if you are considering service, or if you consider economics. I will not go so far as to say that there are very decided limitations as to the amount of load, because you can pull capacity into Norris from other places. If you put the copper or aluminum up to pull it with, you can get it there.

I think I can give you a quotation with regard to the assumptions I made as to the operation of Norris Dam. In 1935, before the Military Affairs Hearing in Washington, Dr. Morgan, the Chairman of the TVA, made this statement: "Then in the matter of electric power, power transmission is not limited to a given area. Our ordinary distance of transmission is about 200 or 250 miles, yet if there was a demand for power in Pittsburgh, or in Ohio or in Washington, we could transmit that power at the end of our line to another company and they could send it on for another 200 miles, and thereby you can shift your power load and supply it in other places that would be in need of it, and that is an emergency source of power that is very significant." Dr. Morgan has talked quite a little bit in different places, and I have heard him, which gives me the impression that that is the intention, to transmit quite long distances. I would not say that my testimony is based only upon the assertions that I have heard and read.

I don't know how much of the power available at Norris has already been contracted for. I have heard of the contractual relations with the Aluminum Company of America [fol. 86] and the figures on how much of that power they are going to take away. It has not, however, affected my conclusion when we are considering a 660,000 to 1,000,000 kw. capacity. I get that in part from Dr. Morgan and I think some of it from Mr. Lilienthal. I have a clipping here, giving the claimed capacities of these various dams, showing 660,000 kilowatts capacity in dry seasons and 700,000 kilowatts in wet seasons.

If our industrial customers are not satisfied with our service, they could put in their own power plants. There is no doubt that generally some industrials do generate their own power. I would not say, however, that the manufacturers of steam generating equipment and Diesel engines are in competition with us, although if asked to do so, they do supply the means.

I mentioned in my direct testimony that any disturbance in the so-called integrated system would react unfavorably on the entire system. That same unfavorable reaction would occur if a municipality in the area or several municipalities in the area put in their own generating plants and generated their own power and distributed it, rather than if they bought it from somebody else.

The stock and bonds of the Kentucky company and of the Kingsport company are both pledged under the mortgage of the Appalachian Electric Power Company. The Appalachian is the parent of those two companies. I have no knowledge or information concerning the value and list prices of the securities of the Appalachian company. I have not informed myself as to what the securities are selling for or what they are listed at, so that I cannot tell whether or not they are selling for more or are listed at [fol. 87] higher prices now than they were three years ago. I don't suppose I have noticed anything except a quotation of the preferred stock of the Appalachian company in the last two or three years. I have noticed within a year that the Appalachian preferred stock was quoted above par. I could not tell whether or not in 1936 those securities reached a new high during the past seven years, but it would be very strange if they had not. I do not remember any public offering by the Appalachian of any securities within the last five or six years. Since the last offering,

the funds necessary for the capital requirements of the Company, aside from those that are available from revenues, have been obtained by loan from the parent company, the American Gas & Electric Company.

During 1936, the total energy output of these three companies was somewhere in excess of 1,300,000,000 kilowatt-hours. I do not think from memory that it is quite right to state that this is an increase of 80 per cent in the last four years. (After examining papers.) The sales to customers in 1933 were 912,000,000 kilowatt-hours. In 1935, they were 1,154,213,284 kilowatt-hours. In 1936, they were 1,351,653,286 kilowatt-hours and for the seven months ending July 31, 1937, 830,910,109 kilowatt-hours. That is the Appalachian, not the combined figures, but that reflects the others quite closely because of the interconnections.

In 1936, the number of customers was 137,970 for the Appalachian Company, 21,170 for the Kentucky & West Virginia, Company, and 4,358 for the Kingsport company. You cannot compare these figures with 1932 because there have been other properties brought into the Company since that time, which brought in quite a large list of customers. There has not been a large increase in the number of customers since 1932 in the immediate territory [fol. 88] that was served in 1932. There has not been a great number of customers added because of saturation, because we had already got up to a pretty good sized figure. But there has been some increase.

The kilowatt-hour use by residential customers has increased ever since we took these properties and started work on them ten years ago. The average kilowatt-hour consumption per residential customer, in 1932, it was 607, in 1936 it was 761. That is of the Appalachian Electric Power Company. For the Kentucky & West Virginia Company, Inc. it was 498 and 613, and for the Kingsport Utilities, Inc. it was 655 and 914.

Dividends were paid on the stock of the Appalachian Company for 1933, 1934, 1935 and 1936, but I haven't the figures. The preferred stock dividends went to a great many people probably thirty or forty thousand. The common stock dividends were paid to the American Gas & Electric Company, who own all the common stock.

We supply quite a number of small private companies in the territory that I have described here as the territory

of these three companies. These small private companies that we have never taken over, are scattered here and there, little things, nothing large. We supply the Point Pleasant Water & Light Company of West Virginia. The Columbus Railway & Light Company is in the State of Ohio and the Appalachian Company does not supply that. That is the parent company of Point Pleasant Water & Light Company. I have heard of the Floyd Electric Power Company, but cannot place it. I think it is operating in our territory, a little bit of a company up there.

Complainants' Exhibit 50 shows dependable capacity. That is not all the capacity we have. We have several other plants in the system. The report (Complainants' Exhibit 50) shows only dependable plants. The tabulation correctly shows Cabin Creek plant with an installed capacity [fol. 89] of 116,340 kilowatts, every bit of which is dependable capacity. In response to the question whether or not the Company in 1933 reported to the Federal Power Commission that due to limitations of boiler plant capacity the dependable capacity of that unit was only 100,000 kilowatts, I will say that a number of things have been done in that plant which brings that plant to a dependable condition. However, I think if you will want to question me on this, you will get better results from our engineer who will follow me at a later day. I do not know whether that report was made or not. I did not make it.

The installation of the Kenova plant of 40,000 kilowatts is dependable capacity.

"By Mr. Fitts:

Q. I will ask you whether or not it is true in 1933 the Appalachian Power Company reported that the dependable power of that plant was 32,000 kw., because of limitation of boiler plant?

Mr. R. T. Jackson: I object to this question, because counsel is using a report of 1933. If he would use the latest report, then it might be relevant, but to go back four years and use a report when there are intervening reports, it is not.

Judge Allen: Objection overruled.

Mr. R. T. Jackson: Exception."

There were more boilers installed and that plant is able to carry its load. I know of my own knowledge that there

has been a change since the 1933 report. I know nothing about the 1933 report, however.

We have listed the Byllesby plant with a capacity of 21,600 kilowatts.

“By Mr. Fitts:

Q. Do you know whether or not the same report to the Federal Power Commission in 1933 listed the dependable capacity at 11,300 kw., because of limitation of low water flow?

[fol. 90] Mr. R. T. Jackson: The same objection, for the reason that use is being made of a report superseded by some four subsequent reports.

Judge Allen: The objection is overruled for the reason that it goes to the weight rather than the competency. The Court considers the evidence competent.

Mr. R. T. Jackson: May I say in explanation, that if there have been filed with the Federal Power Commission reports since that time showing a changed condition in accordance with the exhibit introduced by the witness—

Judge Allen: It may be brought out.

Mr. R. T. Jackson: It would seem improper to use an earlier one that reflected conditions long superseded.

A. I think both reports are correct. This report is correct and the report you are talking about is correct.”

The tabulation correctly lists the Buck generating plant with a capacity of 7,740 kilowatts. That plant was in existence in 1933. I do not know whether or not it was listed in the report to the Federal Power Commission in 1933, but if it was not, it should have been listed. You are dealing with this report of installed capacity, in that report you are talking about an entirely different thing. Dependable capacity is 24 hours a day, 365 days a year. As to whether it is true that the reports to the Federal Power Commission represents dependable capacity and excludes everything that is not dependable, I will have to ask you not to question me about that report to the Federal Power Commission, because I never saw it and know nothing about it. I do not know what my company was asked to report to the Federal Power Commission.

My list includes the Reusens Plant with a capacity of 12,500 kilowatts. That is dependable capacity whenever

there is water for it. I know of my own knowledge that it is dependable when there is enough water to run it. As I [fol. 91] never saw the 1933 report to the Federal Power Commission, I do not know whether it listed the dependable capacity of that plant at only 3,400 kilowatts, because of the low water limitations.

The tabulation shows installed capacity at the Niagara plant of 2,910 kilowatts. That is dependable capacity only when there is water for it. That is not firm power 24 hours a day every day in the year. It is listed here as installed generating plant capacity. As to whether the report to the Federal Power Commission lists the capacity at 1000 kilowatts I will have to say over again that I do not know anything about that report.

We have listed the generating plant of the Kingsport Utilities with installed capacity of 11,440 kilowatts. That is dependable capacity. It is a steam plant. I do not know whether or not the Kingsport Utilities reported to the Federal Power Commission that the boiler capacity of that plant was limited to 6,000 kilowatts, but I do know I have been running 8,000 for the last month. I do not know whether 11,400 was ever run steadily all the time. Kingsport's demand does not run that high. I think it could, if necessary, produce 11,400 kilowatts.

I think the dependable capacity of the Hazard plant of the Kentucky & West Virginia Power Company of 19,500 kilowatts is correct. We have operated it at 18,000, but I do not know for how long a time. I do not know how many days, how many hours it carried that load. It could not carry that indefinitely. As to whether we reported to the Federal Power Commission only 10,000 of this capacity as dependable, due to condensing water, I do not know anything about the report you refer to. I never saw or read the report. Capacity that is only available during certain periods of water flow is not regarded in the utility business [fol. 91a] as dependable. The capacity at these hydro plants is limited like every hydro plant in this country with the exception of Niagara Falls that I ever heard of. All hydro plants are limited. I spoke of the formula adopted by the Commission. I did not omit in computing the nonconnected load in the area that rural area of residents who do not come up to the formula, as there are none who would not come up to the formula. There is not a single prospective customer.

[fol. 92] Redirect examination:

The labels on Complainants' Exhibits 50, 51 and 52 read "Appalachian Electric Power Company, Installed Generating Plants, Capacity as of November 1, 1937". Without regard to their firm power capacity, they are dependable plants in that they may be operated at any time. The matter of firm power capacity and the matter of supervision of generating plants are under the jurisdiction of an engineer in my Company. That does not fall under my immediate jurisdiction and I do not follow that closely.

I stated on cross examination that if one of our customers wasn't satisfied, the customer might install a plant of its own. It might also appeal to the regulatory Commission. Assuming that the rural customers in West Virginia are able to satisfy the minimum requirements prescribed by the regulatory Commission of the State of West Virginia, the Commission could compel us to extend service within the area which I have shown as the area where the Company holds out to give service.

One of the hydro-electric plants on the Kanawha River is the London navigation dam. The power house and the generating facilities are constructed and owned by the Kanawha Valley Power Company, an affiliate. The Kanawha Valley Power Company pays the Government an annual rental for the raw water, or water under pressure, which has incidentally resulted from the construction of the navigation dam. The Kanawha Valley Power Company provides the power house and all facilities for manufacturing that water under pressure into electricity. When I speak of leasing that capacity on the part of the Appalachian Electric Power Company, I refer to a lease by the Appalachian Electric Power Company from the Kanawha Valley Power Company. The situation is exactly the same with reference to the [fol. 93] power house and generating facilities at the Marmet navigation dam, and at the Winfield navigation dam on the Kanawha River. The power house and generating facilities are being constructed at the cost of the Kanawha Valley Power Company, and will be owned by that company. The Kanawha Valley Power Company in each of those plants is a licensee under the Federal Water Power Act.

I do not know much about whether or not the Government has also asked us to lease or build a power house and generating facilities and to lease or purchase water under pres-

sure at the Gallipolis navigation dam on the Ohio River. That would fall to a contract with the Ohio Power Company and not to a contract with the Appalachian Electric Power Company.

We carry on business in the counties of Hawkins and Sullivan in Tennessee. I know it to be a fact that the TVA has a county franchise for the construction, maintenance and operation of electric lines in Sullivan County, Tennessee.

What has been referred to as the Buck plant is sometimes called Byllesby No. 4. They are known as Byllesby No. 2 and No. 4. Byllesby proper is No. 2 and Buck is No. 4.

Recross-examination:

The dams which I mentioned on the Ohio and Kanawha Rivers are navigation dams. They are low head dams, they are not high dams, but they do produce electric energy. They produce electric energy a part of the time, but do not produce it all the time.

Redirect examination:

When I testified on cross examination as to a power pool in connection with Norris Dam and the construction program of the Tennessee Valley Authority, my testimony was based in part upon a table which appears at page 279 of the printed hearings before the Subcommittee of the House [fol. 94] Appropriations Committee in charge of deficiency appropriations on the first deficiency Appropriation Bill for 1936, 74th Congress, Second Session, which table shows at the bottom this statement: "Continuous capacity of integrated system kilowatts 660,000 kw.; annual primary output 5,780,000,000 kilowatt hours; estimated annual gross wholesale power revenue \$23,120,000."

(The witness was excused.)

H. R. BLAND was called as a witness on behalf of the complainants and, having first been duly sworn, was examined and testified as follows:

Direct examination:

I am 45 years old, reside in Jackson, Tennessee, and am Secretary-Treasurer of the West Tennessee Power &

Light Company. As such, I have custody and control of the corporate records of the Company.

The tabulation (offered and received in evidence as Complainants' Exhibit 71) is a memorandum of franchises granted the West Tennessee Power & Light Company and commission approvals thereof. The tabulation (offered and received in evidence as Complainants' Exhibit 72) is a memorandum of consents of the Tennessee municipalities and orders of approval of the Tennessee Railroad and Public Utilities Commission to assignments of municipal and county franchises to the West Tennessee Power & Light Company.

As Treasurer of the Company, I have charge of the books of account and the payment of bills for the Company including the billing and paying of taxes. The tabulation (offered [fol. 95] and received in evidence as Complainants' Exhibit 73) shows the taxes of all kinds paid by the West Tennessee Power & Light Company for the years 1932 to 1936, inclusive, and our estimate of what the taxes will be for the year 1937. This tabulation also shows the gross revenue of the Company for the years 1932 to 1936, inclusive, with our estimate of what the revenues will be for the year 1937. It also shows the percentage that the taxes bear to the gross revenue for those years and for the estimate for 1937.

(The witness was excused.)

JOHN WISDOM was called as a witness on behalf of the complainants and, having been first duly sworn, was examined and testified as follows:

Direct examination:

I live at Jackson, Tennessee, am 56 years old, and am at present General Manager of the West Tennessee Power & Light Company. (Mr. Wisdom's qualifications were then conceded.)

The map (offered and received in evidence as Complainants' Exhibit 74) shows the lines of the West Tennessee Power & Light Company, with the exception of distribution lines, the local distribution systems being indicated by black circles. In addition to the transmission and distribution systems indicated by the map, we have steam plants located at

Jackson, Humboldt, Brownsville and Ripley, and oil engine plants at Henderson and Halls.

The tabulation (offered and received in evidence as Complainants' Exhibit 75) shows the kw. capacity of the installed generators in the six power stations. Combined [fol. 96] installed capacity of the Company's generating facilities is 5,226 kw. We have a connection with the Memphis Power & Light Company for the purchase of current at the Shelby and Tipton County line.

In addition to the electric power facilities which I have described, we operate natural gas distribution systems in six towns, ice plants in two towns, water works plants in three towns, and a street railway in one town. These various utilities have grown up together historically, managed by the same foremen and officers, and they are closely intermingled. There is no corporate separation. They are all departments of the West Tennessee Power & Light Company and constitute one operating organization as far as the general overhead is concerned.

The Company was organized in 1887 as a horse-car line at Jackson. It was later electrified, and at the same time the Company began the sale of power. In later years we purchased various plants around West Tennessee, and in 1928 these plants were thrown together into one company, known as the West Tennessee Power & Light Company. We serve in nine counties in West Tennessee. There are some industries at Jackson and Humboldt. The balance of the territory is largely rural and agricultural. Since July 1, 1928, the Company has spent about \$500,000 for construction and expansion of its electrical business and facilities.

The tabulation (offered and received in evidence as Complainants' Exhibit 76) shows, for each of the past ten years, the revenue from residential and farm customers, the energy sales in kilowatt-hours to residential and farm customers, the energy sales in kilowatt-hours to all other customers, the industrial sales in kilowatt-hours, the per cent that the industrial bear to the total kilowatt-hours, the number of customers served, the average revenue per residential and farm customer, and the kilowatt-hours used by the average residential or farm customer. All of our business is conducted [fol. 97] within the State of Tennessee. The business and rates of the Company are regulated by the Tennessee Railroad and Public Utilities Commission. (Counsel for defendants objected to the last column of the tabulation, Com-

plainants' Exhibit 76, containing information as to the rates charged by this complainant, and moved to strike that portion of the exhibit that related to the rates charged, upon the grounds that this data was immaterial and irrelevant in the case. At this point the following occurred):

"Judge Allen: The motion to strike out the itemized information concerning the rates per kilowatt hour is granted.

It is the ruling of the Court that evidence on rates of the Utilities and rates of the Tennessee Valley Authority is immaterial to this controversy. This is not a rate case.

Mr. R. T. Jackson: If your Honor please, I will reserve my remarks until the matter comes up in another connection, and save an exception.

Mr. Seymour: Do I understand the Court to mean that the exhibit is received in all other respects?

Mr. Fitts: Yes, there is no other objection.

Judge Allen: They may be received."

Cross-examination:

None of the securities of my Company are outstanding in the hands of the public at the present time. I do not remember the approximate last date of public offering or issuance of securities to the public. All the funds necessary for the Company's capital requirements are furnished by affiliated companies. The securities of the Company are owned by the National Power & Light Company.

I do not remember the maximum load or peak load of the Company in kilowatts for the year 1937, but it was something like 6,800 kw. That is higher than the loads in kilowatts in previous years. It was the highest in the history [fol. 98] of the Company. I do not recall the approximate figure for the year 1934, but it was somewhere in the neighborhood of 4,300 kilowatts. The energy sales in kilowatt-hours of the Company reached a new high for the twelve months ending July 1937.

The municipalities in the claimed area of my Company which own and operate their own municipal distribution systems are Covington, Somerville, Bolivar, Milan and Trenton. They owned and operated distribution systems before the year 1933. Somerville, Bolivar and Milan have contracts with the TVA. They owned and operated their own distribution systems before TVA was organized and did not purchase any power from my Company. There are

some unserved industrial concerns in the claimed area of my Company. Roughly, we generate about half of the power used on our system and purchase about half from the Memphis Company. We operate in Madison County, and serve somewhere around 500 rural customers in that county.

"Q. Do most of those rural customers reside along main highways upon which your Company's transmission lines run?

A. No, not all of them.

Q. Do substantially all of them?

A. I would not say so, no.

~~Q. Do most all of them?~~

A. Well, if you would allow me to describe it in this way—we have lines that go out the main highways with branches off of those lines down the side roads.

Q. You mean drop lines?

A. No, branch lines.

Mr. Seymour: May it please the Court, we desire to except to this type of questioning now, as being beyond the scope of the examination of the witness in chief, and we are expecting to put on a witness who will deal with that subject. [fol. 99] Judge Allen: Upon that question the Court, in order to keep the record clear, wishes to make a further statement. It is, of course, the general rule that the cross examination shall be limited to matters brought out in chief, but there is a very definite qualification to that rule as laid down by the Supreme Court in 174 U. S. and followed by the Federal cases generally. It is that the extent and manner of the cross examination of a witness on matters not brought out in chief lies within the sound discretion of the Court.

Now the Court has deliberately and unanimously decided to permit cross examination in this case, even upon matters not connected with the examination of any witness in chief. This right will be available on equal terms to each litigant. We have made this decision in view of the number of complainants, the number of witnesses, and the fact that the witnesses are drawn from widely scattered points from a number of several states, and we think that we exercise our sound discretion in permitting such a full cross examination of every witness if and when desired. A strict adherence to the rule as stated, without the qualification laid down by the Supreme Court, would compel many witnesses to travel many miles for direct examination, and either to remain here

in Chattanooga in attendance upon the trial for an uncertain number of days, or to come back again for the purpose of examination by opposing counsel.

We believe that this decision which we have arrived at in the interests of economy and of the convenience of all parties and the witnesses, which will be carried out for the equal benefit of every litigant, lies within our sound discretion as defined by the Supreme Court of the United States. An exception, of course, may be taken to this ruling."

There was a hearing before the Railroad and Public Utilities Commission of Tennessee where we made application to build certain rural lines in Madison County. I am familiar with the Commission's order of May 18, 1937. We make reports to the Commission and I would say that the Commission has some general familiarity with the Company's business. I would not agree with a statement by the Commission that most of the rural customers served in Madison County by my Company were served by transmission lines along highways.

[fol. 100] Redirect examination :

Our Company is delivering electricity to the City of Jackson in connection with its municipal business. There is no contract, just a course of month-to-month dealing.

The cooperatives operating in our territory which are purchasing power from the TVA are the Gibson County Electric Membership Corporation and the Southwest Tennessee Electric Membership Corporation. They are operating in our territory and have built a great many rural lines in various counties. The Southwest Cooperative has run lines from the Jackson substation to the west part of Madison County, through Haywood County and into Tipton County. Those lines were built by the TVA. Besides those cooperative lines, the TVA has a transmission line from Pickwick Dam to Jackson. The TVA has a contract with the City of Jackson for the sale of power to be used for its municipal purposes, instead of the City getting that power for that purpose from us, as it now does. The TVA has a contract with the City of Jackson, by which the City will render service in the territory in which we are now serving private customers.

It is not correct to say that we are serving everything in the City of Jackson and that surrounding territory, except that the municipality of Jackson buys power from us at the present time and renders that service for itself for street lighting and its traffic lights. They buy some power from TVA and some from us. They commenced buying power from TVA something like a year ago. Prior to that time, they had their own municipal plant, but we have always rendered some municipal service. They have generated the great majority of the power they used. We only furnished to outlying schools and things that were off their lines.

Prior to the advent of the TVA into our field, there was a privately owned plant at Bells, Tennessee, the Bells Water [fol. 101] & Light Company. Then there was a privately owned plant at Gibson. They did not generate their power, but purchased power from us. Prior to the advent of the TVA, there were no persons or corporations generating power that was sold by them in our territory.

Recross-examination:

One of the two rural corporations which is purchasing at wholesale their electricity from the TVA in our territory is the Southwest Tennessee Electric Membership Corporation. None of the customers now being served by the Southwest Tennessee Corporation previously received service from my Company. All of the customers of that corporation previously were unserved. I understand that about 700 customers are now being served by that Corporation in the three counties. Excluding the area around the town of Gibson, there are not to my knowledge any customers of the Gibson County Electric Membership Corporation which were previously served by my Company. I do not know how many rural customers in our area are now being served by the Gibson County Corporation.

With reference to selling power at wholesale to a privately owned company which was operating in the town of Gibson, there were about a hundred customers there. The load represented approximately 50 kilowatts. At the time we sold power to the Gibson Power & Light Company at the outskirts of the City of Humboldt, and they carried the power to Gibson over their own line about five miles. I know very little about the physical condition of that property in this community, as I have not looked over it in recent years.

The only thing I know about the financial condition of the Gibson Light & Power Company was that they met their light and power bills very promptly. I recall some advertisement of the sale through a trustee of their property in the Town of Gibson and was present at a sale when the property was sold. I did not bid on the property. It was [fol. 102] bought by a Mr. Wright, but I do not remember the sale price.

The City of Jackson has voted bonds to either build or acquire a municipally-owned distribution system. It is my understanding that the City of Jackson intends, under the contract mentioned, to buy power from TVA to be distributed over the system which that City owns in the Town of Jackson, or will own.

I was made Vice President and General Manager of the West Tennessee Power & Light Company when it was organized in 1928, and later became President. The City of Jackson did not, to my knowledge, in 1931 issue bonds for the construction of a municipally-owned distribution system.

• (The witness was excused.)

J. C. YORK was called as a witness on behalf of the complainants and, having been first duly sworn, was examined and testified as follows:

Direct examination:

I am 47 years old, reside at Bristol, Tennessee, and am employed as Secretary-Treasurer of the East Tennessee Light & Power Company and Tennessee Eastern Electric Company. As Secretary-Treasurer of the two companies, I have custody and control of the corporate records and books.

The tabulation (offered and received in evidence as Complainants' Exhibit 77) is a memorandum of the consents of the Tennessee municipalities and orders of approval of the Tennessee Railroad and Public Utilities Commission to the assignments of municipal and county franchises of the East Tennessee Light & Power Company and the Tennessee [fol. 103] Eastern Electric Company. Item No. 4, referring to the municipality of Butler, does not show any con-

sent to the transfer of Butler Light & Power Company. At the time of the transfer of the Butler Light & Power Company, as well as Roan's Creek Light & Power Company, both companies were being operated by an individual and transfers by them did not require the approval of the Commission. The individual was Chas. E. Ide, Vice President and General Manager of the East Tennessee Light & Power Company. He was operating the Butler Light & Power Company and the Roan's Creek Light & Power Company. The latter is Item No. 8, with reference to Mountain City.

The tabulation (offered and received in evidence as Complainants' Exhibit 78) is a memorandum of the franchises granted the East Tennessee Light & Power Company and the Tennessee Eastern Electric Company and the Commission's approval. The Greenville franchise has not been approved by the Commission but was issued before the approval of the Commission was required, I believe. The Commission was organized in 1919, I believe. The franchise was granted by Greenville in 1912, as shown by the statement. My companies are operating in three states—Virginia, Tennessee and North Carolina. The two exhibits to which I have testified had reference only to the State of Tennessee.

The tabulation (offered and received in evidence as Complainants' Exhibit 79) is a memorandum of the Virginia Highway permits of the East Tennessee Light & Power Company. The State of Virginia in improving the main highways, as well as the secondary highway system, passed a ruling that no telephone or electric light or power company may string wires along or across the main highways, or the secondary system, without a permit from the State Highway Department of Virginia. This is a correct list of those permits. The State of Virginia does not require any consent or approval of franchises issued in that state by municipalities or counties. That is also true in the [fol. 104] State of North Carolina.

The tabulation (offered and received in evidence as Complainants' Exhibit 80) is a tabulation of the tax payments, including Federal, state, county and other taxes of the East Tennessee Light & Power Company for the period 1932 to 1936, inclusive, showing the actual amount of taxes paid for those years, and the estimate for the amount of taxes paid and to be paid for the year 1937. It also shows gross revenues of the Company for each of the years 1932 to

1936, inclusive, with an estimate for 1937, and the percentage of the taxes paid to the gross revenue.

The tabulation (offered and received in evidence as Complainants' Exhibit 81) is a tabulation of the Federal, state, county and other taxes paid by the Tennessee Eastern Electric Company for the years 1932 to 1936, inclusive, and estimated amount of taxes paid and to be paid for 1937. It also includes a statement of the Tennessee Eastern Electric Company's gross revenue, and the last line shows the percentage of taxes to gross revenue.

(The witness was excused.)

CHARLES E. IDE was called as a witness on behalf of the complainants and, having been first duly sworn, was examined and testified as follows:

Direct examination:

I am 45 years old, reside in Bristol, Virginia, and am Vice President and General Manager of the East Tennessee Light & Power Company and the Tennessee Eastern Electric Company. (The witness' qualifications were conceded.)

The map (offered and received in evidence as Complainants' Exhibit 82) shows the general territory served by the [fol. 105] East Tennessee Light & Power Company and the Tennessee Eastern Electric Company, the transmission and distribution lines, generating plants, interchange facilities and proposed hydro plants. The distribution systems in the various towns are not shown in detail, but are indicated by the large orange colored circles. The heavy lines are the high voltage transmission lines of 22,000 volts and above and the lighter lines are the lower voltage, 11,000 volts and under.

In addition to the electric lines indicated, the locations of the generating facilities are also shown on the map, and are indicated by the green circles. There is a small hydro-electric plant near Elk Park, North Carolina; a plant near Maymead, Tennessee; a hydro-electric plant near Elizabethton, Tennessee; another hydro-electric plant on the Nolichucky River below Greeneville, and the steam plant on the Watauga River near Johnson City.

The tabulation (offered and received in evidence as Complainants' Exhibit 83) shows the installed capacities of the various plants owned by the East Tennessee Light & Power Company and the Tennessee Eastern Electric Company.

The East Tennessee Light & Power Company has an interconnection with the Appalachian Electric Power Company at a point just north of Bristol, which is shown by the parallel blue lines. The East Tennessee Light & Power Company also has interconnections with the Edmondson Electric Company at a point northeast of Bristol, which is likewise shown by parallel blue lines.

In addition to the generating facilities and interconnections which I have testified to, the East Tennessee Light & Power Company owns a small power site above the present hydro-electric plant near Elizabethton, which is shown by the brown square. The Tennessee Eastern Electric Company owns a site known as Hemlock at a point near Fordtown, Tennessee, which likewise is shown by a brown [fol. 106] square. The contemplated capacity of this development is 36,000 kilowatts. The Tennessee Eastern Electric Company likewise owns a site known as Kiker on the Nolichucky River below the present development, which has an ultimate capacity of 15,000 kilowatts. There is likewise a site known as the Buckingham site on which some preliminary work has been done and some water rights acquired. Extensive engineering work and core drilling has been done on the Hemlock site. A large part of the flowage lands have been acquired. Some preliminary work has been done on the other sites. The Company has already expended in excess of \$850,000 in preliminary engineering work, core drilling and acquisition of property. Some study has just been made of an additional steam unit at the Watauga Steam Plant near Johnson City. There is sufficient water in the river there for condensing purposes and ample land and other facilities for such an extension.

The proposed hydro sites are indicated on the map by brown squares. There is no indication on the map to show any contemplated expansion at Watauga Steam Plant, although the location of that plant is shown by a green circle near Johnson City. There is ample water for condensation purposes, and land and other facilities for such expansion.

In addition to its electric business, the East Tennessee Light & Power Company owns and operates a small gas manufacturing and distributing system in the Cities of Bristol, Virginia, and Bristol, Tennessee. The Tennessee Eastern Electric Company has no non-electric property, and the gas operation which I just mentioned is the only non-electric property of the East Tennessee Light & Power Company. The revenue from the gas operation is less than 10% of the total revenue of the East Tennessee Light & Power Company.

The territory where these two companies operate is [fol.107] generally mountainous, with a considerable amount of good farm land and diversified industries; a number of small cities and towns; the largest city in the territory would not exceed 30,000 population. We are serving every request for service that the Companies have had in that territory.

The entire property of the Tennessee Eastern Electric Company is within a 100 mile radius of Norris Dam. The lines in Greene County are within a radius of 50 miles of Norris Dam. The property of the East Tennessee Light & Power Company is partially within the 100 mile radius, the bulk of it is within a 115 mile radius, and the entire property is within a 135 mile radius of Norris Dam.

The East Tennessee Light & Power Company has outstanding 5% bonds of \$481,000 par value, 6% bonds of \$300,000 par value, and 5½% bonds of \$1,950,000 par value, making a total bonded indebtedness of that Company of \$2,731,000. It likewise has outstanding cumulative no par value preferred stock carrying \$6 annual dividend rate of 2,635 shares and 35,000 shares of no par value common stock.

The Tennessee Eastern Electric Company has outstanding 5% bonds in the amount of \$1,952,500; 6% bonds in the amount of \$717,000; making a total bonded indebtedness for that Company of \$2,669,500. It also has outstanding 6,000 shares of 6% cumulative preferred stock of \$100 par value. It has outstanding 5,105 shares of cumulative no par value preferred stock carrying a \$7 annual dividend rate. It also has outstanding 15,000 shares of no par value common stock. These securities were issued with the approval of the Railroad and Public Utilities Commission of Tennessee.

The development of the business of the Company has consisted primarily of gathering together a number of small operating units and welding them together into one coordinated system. This has required the construction of [fol. 108] many new transmission lines to improve the service to these communities. Having done that, we have proceeded aggressively to promote the business of the Company to the prospective power, commercial and industrial customers, and to extend rural lines in so far as they could economically be extended.

The East Tennessee Light & Power Company is both an operating company and a holding company, in that it owns all the common stock of the Tennessee Eastern Electric Company. The corporate records of the two companies are, of course, kept separate and distinct, but in so far as the actual operation is concerned, they are operated as one integrated system, the same officers, the same engineers, and the same supervisors supervise the operation of both just as though it were one operation.

The East Tennessee Light & Power Company has approximately 204 employes and the Tennessee Eastern Electric Company 125. There are approximately 34 of those who devote their entire time to business development and sales promotion activities.

Since June 1, 1929, to and including June 30, 1937, the construction expenditures of the East Tennessee Light & Power Company have been \$684,408. For the same period, the construction expenditures of the Tennessee Eastern Electric Company have been \$1,164,852, or a combined total for both Companies of \$1,849,260.

The tabulation (offered and received in evidence as Complainants' Exhibit 84) shows for the East Tennessee Light & Power Company the number of miles of transmission lines, miles of distribution lines, total number of customers, number of towns and communities served, the total kilowatt-hours sold to regular customers, the number of urban residential customers, rural residential customers, total residential customers, likewise kilowatt-hours sold per residential customer, urban, rural and total. It [fol. 109] shows also the revenue per residential customer, urban, rural and total, and the average rate paid by the residential customer, and the classifications of urban, rural and total.

"Judge Allen: The Court of its own motion will strike out of this exhibit the figures dealing with the average residential rate.

Mr. Seymour: We note an exception, if your Honor please."

The tabulation (offered and received in evidence as Complainants' Exhibit 85) shows the same information for the Tennessee Eastern Electric Company.

"Judge Allen: The same ruling is made by the Court in reference to Exhibit 85, with reference to the average residential rate being excluded.

Judge Allen: The last three columns and the lower right hand column. It is the ruling of the Court that this evidence is irrelevant.

Mr. Seymour: We so understand and take exception to the action of the Court.

Judge Allen: You may."

With respect to the East Tennessee Light & Power Company for the year 1936, there was a total of 22,904,648 kilowatt-hours sold. 9,243,729 kilowatt-hours, or 40.4 per cent, represent sales of industrial power. We included in industrial power those industrial customers of 50 kilowatts or greater. For the Tennessee Eastern Electric Company for the year 1936, out of 24,548,569 kilowatt-hours, 11,049,650 kilowatt-hours, or 45%, represent sales to the same class of industrial customers.

The East Tennessee Light & Power Company operates in the three states of Tennessee, Virginia and North Carolina. The rates are regulated in Tennessee by the Tennessee Railroad and Public Utilities Commission; in Virginia by the State Corporation Commission; and in North Carolina by the North Carolina Public Utilities Commission. Our rates are uniform for similar services throughout the territory we serve in Tennessee and Virginia and there is a slight variation in our rates in North Carolina. The Company's facilities are entirely ample to take care of the requirements of the territory which we are serving. We have refused no requests for any service which could be economically served.

Cross-examination:

The East Tennessee Light & Power Company owns all of the common stock of the Tennessee Eastern Electric

Company. The common stock of the East Tennessee Light & Power Company is owned by the Cities Service Power & Light Company. The preferred stock of the East Tennessee Light & Power Company is also owned by the Cities Service Power & Light Company.

The TVA does not to my knowledge at this time own or operate any transmission line within the claimed territory of the Tennessee Eastern Electric Company or have any contract for the sale of power used wholesale at any point within the claimed territory of that Company. The situation is the same with respect to the East Tennessee Light & Power Company.

It is substantially correct that in 1936 the Tennessee Eastern Electric Company had the largest output in kilowatts in the history of the Company. I do not have any figures as to the output. The figures as to the sales to the regular customers do not show any such increase as 100% since 1933.

It is my recollection that the Tennessee Eastern Electric Company has not paid any dividends on the preferred stock since about 1934.

Complainants' Exhibit 83 is a tabulation of the generating plants of the two companies concerning which I testified, showing the installed capacities, that is the nameplate rating. I do not know what you mean by dependable [fol. 111] capacities. I don't remember the figures that were included in the report to the Federal Power Commission in October 1934.

I believe we made a report to the Federal Power Commission in October 1934, but the photostatic copy which you show me does not bear my signature. This somewhat resembles the report which we made, but it is not my signature on this report. I have signed several reports to the Federal Power Commission, but this is not my signature and these figures in this report do not appear to be photostatic copies of a report which we sent from our office. I don't remember what we reported on with respect to dependable capacities. It is impossible to carry all of those figures in one's head and I do not remember.

With respect to the difference between installed capacities and dependable capacities in hydro plants, it all depends upon the conditions surrounding the operation. When you are operating a water power plant in connection

with a steam plant, there are certain periods, everyone knows, when the water flow of the streams is low. The kilowatt-hours per day that you could take out of that plant is materially reduced, but by carrying your base load on the steam plant and generating fewer kilowatt-hours on your hydro plant, you can carry a larger amount of load with that hydro plant. Unless the exact conditions which are to be met are described and an opportunity is given to have some engineering calculations made, it is impossible to answer the question. I don't recall whether in making the report to the Federal Power Commission we distinguished between installed capacities and dependable capacities. It has been so long since that report has been made, I have no recollection of what was in it. There have been so many different reports made to the Federal Power Commission. With reference to the other signature on that photostat, it is not the signature of R. I. Butterworth, General Superintendent.

[fol. 112] As to whether there are any unserved industrial loads within the claimed territory of these two companies, there are certain industries, such as woodworking plants, which have refuse for use as a fuel, or paper mills, chemical plants, and so forth, who have certain exhaust steam, by-product steam requirements, who generate their own load. There are a few small flour mills that have water wheels to drive them, and perhaps a few small other plants that may for some reason have their own motive power whose load we do not carry. However, we have never refused service to any of these. Our facilities are ample to take care of them. I don't know what the total load is that I have just mentioned. The Veterans' Home at Johnson City has a very old steam plant of their own which furnishes a part of their power to carry that load at the Veterans' Home. A few years ago they signed a contract with the Tennessee Eastern Electric Company whereby a portion of their power requirements have been purchased from our company, and gradually, from time to time, as they change their system from d.c. to a.c. system, they shift that load over on to our facilities.

I stated on direct examination that the rates of the Tennessee Light & Power Company and the Tennessee Eastern Electric Company in the states of Tennessee and Virginia were uniform, and with a slight exception, with a slight

differential, were the same in North Carolina. The rate forms are not the same as other companies operating in Tennessee. The exact identical rate schedules for a certain class of service used by different companies throughout the state are not uniform. The rate schedules, however, are at substantially the same level. In testifying that our rates are uniform, I meant that we have uniform schedules applicable to different classes of service, and that in the area where we are operating, we apply the same schedule to the particular class of service regardless of territorial location within the area.

[fol. 112a] Redirect examination:

Our companies operate in the counties of Sullivan, Washington and Greene in the State of Tennessee. The Tennessee Valley Authority has had issued direct to it franchises to operate in those three counties; to use the highways in the construction of lines, and so forth. It has the usual type of utility franchise.

(The witness was excused.)

[fol. 113] EDWARD E. NELSON was called as a witness on behalf of the complainants and, having been first duly sworn, was examined and testified as follows:

Direct examination:

I am 45 years old, reside at Glenn Ridge, New Jersey, and am Assistant Secretary and Treasurer of the Southern Tennessee Power Company. (The witness' qualifications were admitted.)

The Southern Tennessee Power Company owns a high tension transmission line from Wilson Dam, Alabama, to Iron City, Tennessee, a distance of approximately 15 miles, which cost about \$500,000 to build. The Company transmits electric energy from Wilson Dam to Iron City, where it delivers it to The Tennessee Electric Power Company. The line also constitutes a connection at Wilson Dam between the Alabama Power Company and The Tennessee Electric Power Company.

The Company has ten shares of stock of no par value, which stands on its books at \$10 a share, or \$100 total. It has a note outstanding which was originally for \$433,500, but which has been reduced by payments to \$380,000.

The tabulation (offered and received in evidence as Complainants' Exhibit 86) is a statement of taxes paid by the

Southern Tennessee Power Company for the years 1932 through 1936, and estimated for 1937.

Cross-examination:

All of the stock and notes of the Southern Tennessee Power Company are owned by The Commonwealth & Southern Corporation. There are no securities of this Company outstanding and in the hands of the general public. The Company has not obtained any capital funds since the [fol. 114] construction of the line, which was in 1930.

The Company now owns only the transmission line with usual facilities. The Company does not lease that line to The Tennessee Electric Power Company, but operates it itself. Up to March 1937, the Company purchased power from the Tennessee Valley Authority at Wilson Dam, which it transmitted over its line and sold to The Tennessee Electric Power Company at the actual cost of the power plus the maintenance cost of operating and maintaining the line, which included the taxes and depreciation, and a return of 6% on the capital investment in the property. Since March 1937, The Tennessee Electric Power Company has purchased power directly from the Alabama Power Company, which was transmitted over this line from Wilson Dam to Iron City, and The Tennessee Electric Power Company paid the Southern Tennessee Power Company the cost of maintenance and operating the line, plus a return of 6% on the investment. The Company does not engage in the generation, transmission, distribution or purchase or sale of electric energy, except for the operation of this one transmission line.

The total gross revenue of the Company in 1932 was \$195,826; in 1933, it was \$231,359; in 1934, it was \$231,143; in 1935, it was \$289,453; in 1936, it was \$436,522. It is now something over \$400,000.

(The witness was excused.)

WALTER M. HOOD was called as a witness on behalf of the complainants and, having been first duly sworn, was examined and testified as follows:

Direct examination:

I reside in Birmingham, Alabama, am 51 years old and am Secretary of the Alabama Power Company.

[fol. 115] The list (offered and received in evidence as Complainants' Exhibit 87) shows the assignments of franchises owned and held by the Company which were originally granted to companies or individuals other than the Alabama Power Company. It shows the name of the transferor, the date of the commission order, if any, approving the assignment, and the date of the consent of the municipality, if any, approving the assignment. It also indicates which transfers involved franchises in more than one municipality and which transfers occurred before the creation of the Alabama Public Service Commission. The list does not include all of the franchises. It only includes the franchises which were granted to others than the Company and it includes all of such franchises.

There are 4 municipalities in which we operate without an existing and unexpired franchise. In the City of Sheffield, the franchise of the Alabama Power Company expired in October, 1932, and was not renewed. We also operate in three small towns, Center, Pritchard and Grove Hill, and we were operating in those communities before they were incorporated.

Some of the transmission and distribution lines of the Company outside of municipalities are located on public roads and highways. The tabulation (offered and received in evidence as Complainants' Exhibit 88) is a list of the certificates of convenience and necessity issued by the Alabama Public Service Commission to the Alabama Power Company for extensions and additions to its system, since October 1, 1920 to July 21, 1937. It was prepared under my direction and from copies of the certificates authenticated by the secretary of Public Service Commission.

Cross-examination.

We do not operate in Tuscumbia and Florence now. The franchises in those towns expired at practically the same time.

(The witness was excused.)

[fol. 116] JAMES M. BARRY was called as a witness on behalf of the complainants and, having been first duly sworn, was examined and testified as follows:

Direct examination:

I am 49 years old and am Vice President and General Manager of the Alabama Power Company. I have been

engaged in the electric utility business since my graduation from college in 1910. I studied electrical engineering and graduated from the University of California with a Bachelor of Science degree in the electrical engineering course.

The map (offered and received in evidence as Complainants' Exhibit 89) is of the state of Alabama on which is indicated the electrical transmission and distribution system of the Alabama Power Company, exclusive of the distribution systems in the cities in which we operate, which, because of the scale of the map, could not be shown. The area indicated by the yellow lines on the map are areas in which other utility companies operate. The area up in the northwest corner of the state, marked by the blue cross-hatched line, is the territory in which Alabama Power Company conveyed to the TVA certain transmission and distribution facilities and in which Alabama Power Company agreed not to operate, exclusive of the cities in which we already did business, during the period of the contract of January 4, 1934. We still have high voltage transmission lines through that area in the northwest corner and we still have operations in some of the cities in that area. Those are indicated by green dots.

The red dots show a differentiation between the marking of our distribution systems in the so-called ceded area and in the rest of the territory. The principal transmission [fol. 117] lines of the system are indicated in the light green lines going down to 22,000 volts and in a few cases below 22,000 volts. The rural lines of the Company are indicated in the red dotted lines. The key as to the size of the lines shown by the solid green lines and the two broken dotted lines in the legend in the lower right hand corner is correct.

The map shows the principal interchange points of the Company.

With respect to the areas included within yellow lines served by other companies, the small area in the north central part of the map is the area served by Birmingham Electric Company. That area is specifically marked out by an order of the Alabama Public Service Commission. The other areas are, respectively, the Tuskegee Light & Power Company in the small areas that cover most of Mason County, and the two areas in the south central part of the map that embrace the areas served by the Alabama Water Service Company. The area in the southwest part

of the state along the Mississippi state line is served by a small company with a generating property in Mississippi, called, I believe, the Interstate Power Company. The area in Baldwin County is served generally by the Riviera Utilities Company.

The circles on the map marked 100, 150 and 200 miles are drawn with centers at the Guntersville Dam site, where a dam is now under construction, and from Wilson Dam, where a dam is now owned and operated by TVA, respectively. Wheeler Dam, which is shown just upstream, does not happen to play any part in the drawing of the lines because the circles drawn from Wheeler Dam would fall within the others.

Referring to such map, there is a municipal plant operated by the City of Cullman in Cullman County, and there is a public plant operated by the City of Dothan in the southeast part of Alabama, and there is a public plant in Baldwin County at Fairhope. Those plants have their own generating facilities. There are other public plants in our area which buy their power from Alabama Power Company, that is: Piedmont, Opelike, Hartford, Sylacauga, Alexander City and LaFayette. There are other public plants that are served in the other areas of other utilities.

The tabulation (offered and received in evidence as Complainants' Exhibit 90) shows the generating plants owned by Alabama Power Company as of October, 1937, giving the installed capacity in kilowatts of each plant. In each instance, the installed capacity is the nameplate capacity. Each of these plants shown on Exhibit 90 is capable of operating whenever it is desired.

Mitchell Dam, Jordan Dam and Martin Dam were constructed under licenses granted by the Federal Power Commission. The hydro-electric dam at Lock 12 is shown on the exhibit as Lay Dam. It was constructed under the authority of a special Act of Congress passed in 1907.

The document (offered and received in evidence as Complainants' Exhibit 91) is a compilation which includes excerpts from the application filed with the Federal Power Commission for a license to construct Jordan Dam, a photostatic copy of the license issued for the construction of Jordan Dam by the Federal Power Commission which is typical of three licenses from the Federal Power Commission, the certificate of the Federal Power Commission

authorizing the license for the project and the commencement of operations, excerpts from the application for Mitchell Dam, excerpts from the application for a license to construct Martin Dam, and excerpts from the licenses for Mitchell and Martin Dams showing the differences between those licenses and the license for Jordan Dam offered as typical.

[fol. 119] The document (offered and received in evidence as Complainants' Exhibit 92) is a copy of an Act of Congress permitting the erection of a dam across Coosa River, Alabama, at the place selected for Lock 12 on said river, approved March 4, 1907.

The document (offered and received in evidence as Complainants' Exhibit 93) is a document giving the approval by the Secretary of War of plans concerning location of the lock at Lock 12, March 3, 1910, and approval by the Secretary of War of supplementary plans for construction of Lock 12, July 8, 1913.

The document (offered and received in evidence as Complainants' Exhibit 94) is a photostat of the approval of the assignment to the Alabama Power Company of the Federal Power Commission licenses for the three dams I have previously described as licensed by the Federal Power Commission.

Each of the projects licensed by the Federal Power Commission has been placed in operation.

The total generation in the plants owned by the Alabama Power Company for the years 1932 to 1936, inclusive, was 7,881,678,312 kilowatt-hours. Of this total, 7,485,971,438 kilowatt-hours were generated at the hydro-electric plants owned by the Company. The generation in the hydro plants for the period was 95% of the total generation in the Company's plants. 82.3% of the total hydro generation was produced in these four plants. It was 6,158,950,000 kilowatt-hours. Expressed as a percentage of the total generation of the plants owned by the Company, the generation in these four plants during that five year period was 78.2%.

I have been with the Alabama Power Company nineteen years and have been identified with the operations of the Company and with the engineering and the construction of the Company and I actually worked on the construction of [fol. 120] Mitchell Dam. All of the hydro-electric plants constructed under license from the Federal Power Commis-

sion were constructed after I came with the Alabama Power Company. I have been familiar with the purpose for which such hydro-electric plants were constructed in the development of the Alabama system, and with the markets which these plants were designed to serve. I am now familiar with the market which these plants serve through the Alabama Power Company system, and know where it is located geographically. During the nineteen years that I have been with the Alabama Power Company, there has been a marked process of development and integration. Among other things, that has involved the purchase and acquisition of plants and connecting the markets up to the transmission system of the Company. I have been familiar with the acquisition of plants during that time in the development of the system.

"Q. Mr. Barry, assuming that under the terms of the Federal Water Power Act, and of the licenses granted by the Federal Power Commission for your hydro-electric developments at Mitchell, Martin and Jordan Dams, the United States has a legal right to take over such hydro-electric developments at the end of the license period for the net investment of the company or for the then fair value of the plant, whichever figure may be lower; what effect, if any, would the taking over by the defendants of all or any substantial part of the market for electricity within a radius of 100 miles of the hydro-electric plants of the Tennessee Valley Authority in Northern Alabama which markets are now and have been served by the Alabama Power Company, have upon the value of the property which the company has in the hydro-electric developments when the United States would be entitled to take over such developments at the end of the license period?

Mr. Fitts: We object to the question on the ground that it calls for irrelevant and immaterial evidence, based upon a hypothesis of facts which are not in evidence, and which, in our opinion, are incapable of proof, and it is further based upon the speculative and remote contingency that the United States may eventually some day want to exercise its power under the Water Power Act to take over the plants."

[fol. 121] "Judge Allen: The objection is sustained upon the ground that the question is based upon an assumption of facts not at present shown in the record."

"Mr. R. T. Jackson: May we have our exception noted, and leave to renew the matter later on if the Court should feel that we have a basis for it? Now, may I have the answer of the witness for the record? Will you read that please?

(Question read.)

A. The taking over of such markets would substantially depress the value of the license projects.

Q. Assuming, Mr. Barry, that the defendants take over all or a substantial part of the market for electricity now served by the Alabama Power Company within a radius of 150 miles of the hydro electric plants of the Tennessee Valley Authority in Northern Alabama, what effect would that have upon the value at which the United States would be entitled to take over such plants at the end of the license period?

Mr. R. T. Jackson: I am only trying to complete this. I hate to impose on the Court to do so, but it seems we have to.

Judge Allen: You have to make your record.

Mr. Fitts: We made the same objection upon the same grounds stated to the previous question.

Judge Allen: The same ruling. Objection sustained, and you may be allowed your exception.

Mr. R. T. Jackson: Exception allowed.

Judge Gore: Do you want him to answer that?

Mr. R. T. Jackson: Oh, yes, I do.

A. It would still further depress the value of the license period.

Q. Assuming that the defendants took over all or a substantial part of the market for electricity now served by the Alabama Power Company within a radius of 250 miles of the hydro electric plants of the Tennessee Valley Authority in Northern Alabama, what effect would that have upon the value at which the United States would be entitled to take over such hydro electric developments at the end of the license period.

Mr. Fitts: We make the same objection upon the same ground stated to the other questions.

[fol. 122] Judge Allen: The same ruling, and you may be allowed your exception.

Mr. R. T. Jackson: Exception. And we ask the witness for the answer.

A. It would still further depress such value."

I know of my own knowledge that the Company has made provision for the expansion of its generating facilities shown in Complainants' Exhibit 89, the map of the Alabama system. At Mitchell Dam there is provision for the addition of one 17,500 kw. unit. At Jordan Dam there is provision for one 25,000 kw. unit. At Martin Dam there is provision for one 33,000 kw. unit. At the upper Tallassee hydro plant there is provision for one 16,000 kw. unit. At Gorgas No. 2 steam plant we now have installed one 60,000 kw. unit. The canals and waterways are designed for the ultimate installation of 240,000 kw., so that there is further expansion provision there for three 60,000 kw. units. The foundations are already in place for an additional turbine and two boilers. In addition to these provisions for expansion, studies have been made of the installation of a 50,000 kw. topping unit at our Gorgas No. 1 steam plant. The Gorgas steam plant is located about thirty miles from Birmingham in an air line, in the Warrior coal fields. I should say Birmingham is our largest load center. I should say that the incremental cost of such expansion would be less than independent development per unit of production.

The Company owns a transportation system in Tuscaloosa and a small bus system in Huntsville. It owns a water system in Auburn. It owns a gas distributing system in Phoenix City, and until May of this year, it owned three small ice plants in south Alabama. It disposed of those ice plants in May of this year. Last year the revenue of the non-electric properties represented only 1.1 per cent of the entire revenue of the Alabama Power Company.

[fol. 123] The Alabama Power Company had outstanding as of December 31, 1936, a bonded indebtedness of \$96,771,800; 367,178 shares of \$5, \$6 and \$7 preferred stock at a stated value of \$35,751,258; and 3,775,000 shares of common stock at a stated value of \$48,961,300. These securities were all approved by the Alabama Public Service Commission, except certain issues that were issued prior to the Public Utility Act of 1920. These included \$10,221,000 in bonds; \$461,500 of par value preferred stock and \$18,751,000 of par value common stock. By order of the Public Service Commission in 1921, the common shares of par value were converted into non-par shares, and at the same time an option was given to the par value preferred stock holders to convert into non-par preferred stock, so that in effect

all issues have been approved by the Public Service Commission except the \$10,221,000 in bonds.

The tabulation (offered and received in evidence as Complainants' Exhibit 95) shows the annual revenue, kilowatt-hour sales to customers within the state of Alabama, segregated as to areas within 100 miles of TVA dams, 150 miles of TVA dams, and 250 miles of TVA dams, and further segregated so that one tabulation includes the Birmingham Electric Company, a complainant in this case, and the other tabulation excludes the Birmingham Electric Company. The reason for that is that we serve the Birmingham Electric Company demands at wholesale, and did not want to put in anything that favored a duplication. The calculation on the exhibit is made on the basis of the same dams as form the center of the radii drawn on the map, Complainants' Exhibit 89.

The tabulation (offered and received in evidence as Complainants' Exhibit 96) shows certain statistical data pertaining to the operations and facilities of the Alabama [fol. 124] Power Company, arranged by years from the year 1927 to 1936, inclusive, including the following items: Miles of transmission lines, miles of distribution lines, miles of rural lines, number of customers' meters; residential annual kilowatt-hour use per average customer; residential average annual revenue per customer; the number of towns and communities served directly by the Company; the total kilowatt-hour sales of the Company, exclusive of sales to utilities; the total kilowatt hours sold industrial customers and the percent which the industrial sales represent of the total sales, exclusive of sales to utilities. (There was included on Exhibit 96 a column entitled "Residential average rate per kilowatt hour" which was stricken by the Court on its own motion, and exception taken.)

The tabulation (offered and received in evidence as Complainants' Exhibit 97) shows the tax payments of Alabama Power Company for the years 1932 to 1937, inclusive, with the 1937 figures estimated for the full year, by years, showing the segregation of the various taxes which we pay, the total taxes, the total gross revenue of the Company for each of the years in question, with the 1937 figure again estimated, and the percent represented by the ratio of taxes to gross revenue.

As of the end of October, 1937, there were approximately 2,850 employes of the Company.

[fol. 125] Cross-examination:

The common stock of the Alabama Power Company is owned by The Commonwealth & Southern Corporation. The other companies in the Commonwealth & Southern system in the southeastern area are The Tennessee Electric Power Company, the Georgia Power Company, the Alabama Power Company, the Mississippi Power Company, the Gulf Power Company and the South Carolina Power Company. The Alabama Power Company furnishes to the Mississippi Power Company substantially all of the power that it uses. It does not furnish to the Georgia Power Company a greater part of the power that it uses, but a substantial amount of power. The deliveries of power from the Alabama Power Company to The Tennessee Electric Power Company have not been so great as they have been to the other companies. I should say that the Georgia Power Company is perhaps the heavier user.

Referring to the map, Complainants' Exhibit 89, the so-called "ceded area" is the area involved in the contract of January 4, 1934. On the map we show none of the facilities of the TVA. Prior to the January 4, 1934 contract, the point of interchange with the Mississippi Power Company was near the state line in the extreme northwest corner of Alabama. In other words, the power which we furnished to the Mississippi Power Company for use in the area that was afterwards ceded to TVA by this contract was transported across this area to a point in the northeastern corner of Mississippi and there delivered to the Mississippi Power Company, as near as may be to the state line. We are still furnishing power on that line to certain municipalities in that area. We started purchasing that power from the TVA on November 3, 1937. The reason we are purchasing it is that we have sold to the TVA the facilities that formerly served the towns and cities in which we continue to operate in the area. We are still serving these towns in that area, so to speak, over the same facilities which we formerly [fol. 126] owned and conveyed to the TVA and we have a public obligation to serve those cities so that we must buy power now for them. We have generally absorbed into the system the same power, Wilson Dam power, at least, for sale in that area ever since 1925. It is substantially correct to say that the Company has been buying power from the Wilson Dam, from the Government, down to 1933, and

thereafter from the TVA, continually since Wilson Dam was completed. We have bought a certain block of power every year and have used it to replace power that could otherwise have been generated in our steam plants. Payments made by the Alabama Power Company to the Government for power purchased between 1925 and the date when we began purchasing from TVA were of the order of \$4,000,000. For power purchased from the TVA for the years 1934, 1935, 1936 and down to February, 1937, the Alabama Power Company paid TVA, according to my figures, \$1,134,000.

The properties transferred to the TVA in the so-called ceded area consisted of two primary stations, stepping down the voltage from 110,000 volts to 44,000 volts; they included about 110 miles, according to my recollection, of 44,000 volt lines; they included about 195 or 200 miles of rural lines; and they included the lands and dam-site on which Joe Wheeler Dam is now constructed. I should say the total of my figures was about 350 miles of transmission and distribution lines of various capacities transferred under that contract to the TVA, the biggest mileage being in distribution lines. In addition we transferred the necessary substations which we had there. The TVA is using those in selling us power, and I understand that it is itself distributing in some of the areas over those rural lines we conveyed. The Alabama Power Company today has within [fol. 127] that area no transmission lines except the high tension 100 kv. line which crosses the territory. Over that line we now carry power to Decatur, and the TVA under an interchange gets power at the primary substation at Decatur, and in turn sells the power to us, so we are serving at Decatur over those transmission lines. We serve no customers, with that exception, in that area from that line.

The Alabama Power Company owned the site of the Joe Wheeler Dam, which embraced about 1,649 acres of land. The Company, pursuant to the contract, transferred this property to the Tennessee Valley Authority, and, as a matter of fact, the dam was pretty well built before the conveyance was made. The TVA went right ahead with the construction of the dam. They were not delayed that time. The Company has furnished power by interchange, through a considerable period of time, to the TVA to be used in the construction of the Gunterville Dam, and I remember I had quite an argument about that myself, as to whether that

was properly an interchange or whether that should be a straight purchase of power.

I don't think that the Alabama Power Company interchanged power directly for use in the construction of Pickwick Dam. It may be at some stage of the game that there was, but I simply don't recall that interchange. We are serving some industrial customers in the so-called ceded area today. At the time of the performance of this contract that is in question we transferred to the TVA certain industrial customers. I do not recall what the number of rural customers was that we transferred at that time to the TVA, but I recall that the total customers was something over a thousand altogether.

At the time we transferred those properties to the TVA, the Mississippi Power Company had long since transferred [fol. 128] its system in its ceded area to the TVA. I knew at the time we transferred this mileage of lines to the TVA that the TVA was already operating the properties transferred to it by the Mississippi Power Company.

I don't believe that I know how many or what proportion of the farms in Alabama were without electric service from a central station in 1933. I don't believe I would accept as finally accurate the published estimate or statistics of the Edison Electric Institute to the effect that there were in Alabama only 4.2% of the farms which had electric service from a central station. There are statistics and statistics, and there is nothing so misleading as the statistics on farms. I have no definite opinion as to the number of farms. The question runs to a definition of a farm, and we are actually serving farms within urban areas, according to the Federal definition of a farm. I would not say that prior to 1933 the amount of revenue which my Company received from serving farm areas was a negligible proportion of its whole revenue.

There was an interchange point with the TVA close to Athens, Alabama, which we understand was connected to a line which ran up in the direction of Pulaski, Tennessee. I do not know how long a period we furnished power to the TVA for use in serving Pulaski. I think there was an interconnection there, and I am not certain whether the TVA had its own source in Tennessee or not, or whether it was just a straight interconnection. There was an interchange point at Athens where we did deliver power to the TVA.

Outside of the so-called ceded area in Alabama, I do not know whether the TVA is today actually yet serving any industry in the claimed territory of the Alabama Power Company. It is serving cooperatives outside there, and there [fol. 129] may be industries on them. It is not serving industrial customers so far as I know outside of the ceded area. In addition to the municipalities that are named by me in Alabama outside of the ceded area, which either generate or distribute electric power, I think there are one or two others that operate in the territory of other companies, and also in the area served by the TVA.

The amount of power delivered to the Alabama Power Company by the TVA during the year 1934 was 111,904,431 kilowatt-hours of net energy. In 1935 we purchased in the same way 164,127,787 kilowatt-hours. In 1936 it was 344,308,127 kilowatt-hours. It is substantially correct to say that during those three years, again speaking in very rough and approximate terms, we purchased from the TVA something over 600,000,000 kilowatt-hours. I do not know whether that power which was furnished to us during the year 1936 was generated at Wilson, Norris and Wheeler Dams. So far as I know it was power from Wilson Dam. Our contract was for Wilson Dam power and we had no occasion to make inquiry where it came from. So far as I knew it was Wilson Dam power; I had no occasion to investigate, I never asked any questions where it came from, and I knew nothing to the contrary.

With reference to Exhibit 96, the number of customers that the Alabama Power Company had on January 1, 1933, was 98,350; at the close of 1933, 99,709; at the close of 1934, 107,699; at the close of 1935, 114,187; at the close of 1936, 123,739; and as of September 30, 1937, 134,759. That means taking the number that we started with at 98,000 on January 1, 1933, the number of our customers has increased more than 30% between that date and September 30, 1937. We have done very extensive work in de-[fol. 130]veloping our business during that period and we had a business recovery. During the last nine months alone, we have added on that same basis over 11,000 customers. I haven't checked back the entire history of the Company to find out whether that is the largest proportional increase in any one year in the history of the Company, but I should say no, that during the early 20's we

had as few customers as eighteen or twenty thousand and we built from there up to in the neighborhood of 100,000. That was in the early period of the organization and integration of the Company. We have been in another period of development since 1933. I think we can agree on the fact that the number which we had on September 30, 1937 was the all-time high in the history of the Company.

(At this point counsel for defendants had Stipulation No. 11 marked for identification as Defendants' Exhibit 2 and stated that he desired to ask the witness to read from the table a few figures and shorten the record instead of offering the exhibit at that time.)

Referring to Defendants' Exhibit 2 the gross income of Alabama Power Company increased in 1933 from \$9,030,337.63 to \$10,009,399.05, which would be approximately 10%.

The system peak total in 1932 was 389,120 kilowatts and the system peak total in Alabama was 254,372 kilowatts. The system peak total for the period ending September 30, 1937, was 505,900 and the system peak total in Alabama was 343,520. That would be an increase of approximately 35%. The total shown on that same statement for kilowatt-hours sold in the year 1932, exclusive of sales to utilities, is 777,386,001 and the total for kilowatt-hours sold, exclusive of sales to utilities, for the year 1936 is 1,145,267,755. That would show an increase in those four years of approximately 368,000,000 kilowatt-hours. The total kilowatt-hours sold by the Company in 1932, including utilities, was [fol. 131] 1,164,508,112 and for the year 1936 the total of all kilowatt-hours sold by the Company, including utilities, was 1,888,677,560. That would give an increase of something over 600,000,000 kilowatt-hours or between 50 and 60%. In 1932 our average residential consumption was 798 kilowatt-hours per customer and the same item for the year ending June 30, 1937, was 1227. There was a substantial increase in the average. We have been very aggressive in the residential load.

The principal companies referred to in the statement as to power sold to utilities are the Georgia Power Company, the Mississippi Power Company, the Gulf Power Company, The Tennessee Electric Power Company and the Birmingham Electric Company. Those are the principal ones. During the years from January 1, 1933, down

through the calendar year 1936, I would not say that our net earnings had enabled us to pay substantial dividends on the common stock. We have paid very small dividends on our common stock. In 1933 we paid \$377,500; in 1934 we paid \$377,500; in 1935 we paid \$377,500; in 1936 we paid \$755,000; and nothing in 1937 down to the present time. A total of \$1,887,500.

I think The Tennessee Electric Power Company, as well as the Alabama Power Company, purchased power from Wilson Dam from a point in 1925 down to the beginning of the operation of the TVA in October, 1933. That is an associate company in the Commonwealth & Southern system. I cannot say as to what other purchasers were buying Wilson Dam power from 1933 down to the present time. I think the only large lines connected with Wilson Dam in October 1933 were our lines leading in from the south and The Tennessee Electric Power Company from the north. I cannot say whether that is still a fact. The TVA has done a lot of construction work, and I don't know precisely what they have constructed since. I presume [fol. 132] that Wilson Dam, Norris Dam and Wheeler Dam are now interconnected. The maps that have been published by them indicate that, but I cannot say when they were interconnected. With reference to the question whether we have been regularly delivering portions of the TVA power to the Mississippi Power Company, the Georgia Power Company, and The Tennessee Electric Power Company, I will say the power from Wilson Dam, just like the power from our system, is intermingled in the transmission system of the Alabama Power Company. We have been supplying these companies regularly during all that time from a power pool into which TVA power was moving. As to whether other Commonwealth & Southern Companies also paid for TVA power during the period, I think The Tennessee Electric Power Company also did. The contract of January 4th provides that The Commonwealth & Southern Corporation shall act as the agent for the various companies in the South in making payments. As a matter of mechanics, we pay Commonwealth & Southern and then Commonwealth & Southern pays TVA. It is my understanding that the same would apply to Tennessee Electric Power Company. I think that in addition to the payment made by my Company, there probably were payments for

other power taken by The Tennessee Electric Power Company.

I don't recall right now whether there are any municipalities except Guntersville in the so-called Alabama territory outside of the so-called ceded area with which the TVA has a contract. Nor can I name any rural customers now served by the TVA in the so-called Alabama territory which were previously served by my Company. I understand, however, that in Cullman County some of our customers were taken over by the Cullman County Cooperative now served by TVA.

At the time that the January 4th contract was made, the Alabama Power Company was serving in the so-called [fol. 133] ceded area roughly 10,000 customers. There are no industries of consequence in the territory covered by us that can be served that are not now being served by Alabama Power Company.

I think probably that the rural lines shown on Complainants' Exhibit 89 rather thickly in the upper right hand corner of the map were built since 1933. I never heard the line running across the northeastern corner described as the "Hindenburg line", but I might understand what it meant.

"Q. You said a moment ago, that in all matters relating to the January 4th contract the Commonwealth & Southern Company and, I assume, its officials, acted as agents for your company in carrying on negotiations, is that correct?

Mr. R. T. Jackson: If your Honor please, I would like again to object on the ground of irrelevancy of this line of questioning, and to ask the Counsel for the Tennessee Valley Authority to inform me, with the Court's permission, what the relevancy is in their view of questions with reference to delivery of power and things of that character.

Judge Allen: What do you plan for it, Mr. O'Brian?

Mr. O'Brian: I beg your pardon?

Judge Allen: What do you plan for it, Mr. O'Brian?

Mr. O'Brian: The witness has testified on direct as to their output, and this evidence is offered by the complainants in relation to their claims for damage, I assume, from the Tennessee Valley Authority. I am seeking to establish that with full knowledge of those claims business was transacted freely between these parties during all of this period and they availed themselves of the Tennessee Valley power.

Judge Allen: The objection is overruled.

Mr. R. T. Jackson: Might I state the ground of my objection, if your Honor please? As I understand the statement that Mr. O'Brian just made it is that with full knowledge of something, I don't know just what, the Alabama Power Company received certain power from Wilson Dam.

Now, the point of my objection is simply this: If that could have any possible relevancy it would have to be upon a theory of estoppel, something of that nature, urged by the defendants.

[fol. 134] Now, I think it has no probative value on that issue in any event, and in the second place the Ashwander Case, which our friends are so fond of referring to, specifically held that there was no estoppel against the Alabama Power Company by reason of the fact that it had purchased power at Wilson Dam from 1925 until 1933 or 1934, whatever is the critical year involved in the Ashwander Case, so that any claim of that kind is foreclosed, and we submit that any testimony upon that point is irrelevant.

Judge Allen: The objection is overruled.

Mr. R. T. Jackson: May we have an exception noted, if your Honor please.

The Witness: Please read the question.

Q. I really repeated what I understood to be your testimony. You said in matters relating to this contract of January 4th, and its performance, as I understood you, the Commonwealth & Southern acted as agents for the four companies?

A. I referred to the power transactions under the contract.

Q. Yes, that is all I am referring to.

A. Mr. O'Brian — and I —

Q. That is all I am referring to.

Mr. R. T. Jackson: I object to the question. Whatever the relationship is under the contract appears from the contract itself. I have no objection to the witness stating what has been done, but whether or not there was a legal agency under the contract I think should be established by the contract.

Judge Allen: I might say that the Court considers that this line of testimony has bearing upon the question of adequate service.

We are aware, of course, of the holding of the Supreme Court in the Ashwander Case with reference to estoppel,

and we consider the question competent which was objected to, because it had some bearing upon the question of adequate service.

Mr. R. T. Jackson: My last objection was not meant to renew the other one, but merely as a question of interpretation of the contract, and the agency relations. Is that overruled?

Judge Allen: The objection is overruled.

Mr. R. T. Jackson: May our exception be noted, please. [fol. 135] Judge Allen: Yes.

Q. That was your understanding, Mr. Barry, that with reference to power matters they represented your company?

A. With reference to the—

Mr. R. T. Jackson: May we have the same objection and ruling and exception to the repetition of the question?

Mr. O'Brian: The witness forgot the answer, Mr. Jackson, so did I.

Judge Allen: You may answer the question. The objection will be overruled."

With reference to the billing and handling of the electricity, the Commonwealth & Southern Corporation acted as our agent, and we paid the bills to Commonwealth & Southern, and Commonwealth & Southern paid the TVA. The contract was extended for a three months period beginning in November 1936. The transfer of the properties which was made by Alabama Power Company to the TVA was approved by the action of the Alabama Public Service Commission after a hearing.

I don't, by virtue of my position, keep in touch with all of the daily operations of the Alabama Power Company. There is a daily report that comes over my desk, but I don't examine it daily by any means, because I have so many other things to do. As general manager of the Company, I naturally endeavor to keep as close touch as I can with the operations of the Company.

"Q. And I ask you again whether you did not know in August or September, 1936, that Norris and Wilson Dams were inter-connected?

Mr. R. T. Jackson: I object to the question on the ground at this point it really relates solely to alleged estoppel, and is utterly irrelevant.

Judge Allen: Did the witness not answer that question, Mr. O'Brian?

Mr. O'Brian: He did not answer with precision, your Honor.

Judge Allen: Objection overruled.

Mr. R. T. Jackson: Exception noted."

[fol. 136] I know nothing about the operating conditions that obtained on the system of the TVA at that time. Mr. Neeson is the production manager of Alabama Power Company. I believe that in August 1936 he made an inspection of Norris Dam. I don't recall whether he reported it was generating power or not. I do recall, of course, that we received formal notice from the Authority that Norris Dam was completed about August 1, 1936. I don't recall that our production manager reported it was operating or not. I don't remember one way or the other.

Mr. Eberhardt is the operating engineer of the Alabama Power Company. Mr. Duryea is with the engineering staff of the Commonwealth & Southern of New York. Mr. Duryea's office is in Birmingham. The Commonwealth & Southern of New York has offices in our building, in Birmingham. I have not any recollection of these men ever telling me that Norris Dam was operating. I don't remember that they ever told me it was on the line. It was not necessarily their duty to report to me any circumstances of that character if they knew it. Mr. Duryea does not report to me at all. He gives me information, usually, when I ask for it. Mr. Neeson is in general charge of operation of the plants of the Alabama Power Company, labor relations and numerous other conditions. I did not know that if Norris Dam was generating power, the only place that power could go was on the line to Wilson Dam, when it began operating, because I did not know the conditions up in the vicinity of Norris Dam. I knew there was a big tie line, a high power transmission line, between Wilson and Norris that had been constructed. I cannot recall when I first learned that Norris Dam was generating power. Norris Dam was completed in 1936. We got notice about August 1 that the dam was completed. I will not [fol. 137] swear that I did not learn during the year 1936 that Norris Dam was operating. I don't know when I heard it. I will not deny that I did hear it in 1936. I am very vague on Wheler Dam and had no occasion whatever

to investigate the operations of Wheeler Dam. I think the press in 1936 carried items about the completion of Wheeler Dam, but I did not know that in the course of my official duties.

When this contract was extended on November 3, 1936, I know that there were lines connecting Wheeler, Norris, and Wilson Dams together, but I know nothing about the way they were interconnected for the operations of TVA at the time. It was not my duty as general manager of the Alabama Power Company to investigate the operations of the TVA. I know from the maps that there was a line between Norris Dam and Wheeler and Wilson, I believe. I don't know whether the switches were closed or not. I did not know of my own knowledge that in 1936 Norris was generating power. I think the press carried accounts of it, but I did not think anything about it. I was interested, all right, in the TVA operations, but I could be interested and not know that they were generating additional power at two dams. I don't know how much power my Company took in the month of September, 1936, or how much the Commonwealth & Southern took.

I don't think that it would surprise me if in that month the Commonwealth & Southern companies I have named took more power than was generated at Wilson Dam because we know nothing about how the rivers are operated, and it is perfectly possible to manipulate the pool so that large amounts of power could be generated at Wilson Dam. I have no thought on whether it would surprise me or not to hear that the Commonwealth & Southern companies, including my Company, took more power in that one month than Wilson Dam alone could generate for all of its purposes. My Company may have been furnished with a daily [fol. 138] bulletin showing the gauges of the river as issued by the TVA. So far as I am concerned, I have never seen such a report. That may have happened and not come to my personal attention. I don't deny, however, that that was done.

[fol. 139] Redirect examination:

All of the energy that entered the Alabama system at any time from TVA came from the connection between the Alabama system and Wilson Dam. I believe the installation at Wilson Dam is 184,000 kilowatts.

In connection with whether the Commonwealth & Southern Corporation acted as agent for the Alabama Company in making payments to the TVA, information came to me in my official capacity that Mr. Lilienthal wanted to negotiate with Mr. Willkie for all of the companies.

My recollection is that the lands at Wheeler Dam site were conveyed to the United States rather than to TVA.

On cross examination I was asked for some comparisons between gross income of the Alabama Power Company in 1932 and gross income for the year ending September 1, 1937. I think that the period selected for comparative purposes by counsel for defendants, 1932, is generally accepted as the low period of the depression. The gross income of the Alabama Power Company in 1932 was more than \$3,000,000 less than it was in 1929. The gross earnings in 1932 were \$15,173,317, as compared with \$17,433,654 in 1929. I was also asked for comparisons between gross income for 1932 and the year ending September 30, 1937, and stated that there had been a substantial increase in the last period over the corresponding figures for 1932. The electric gross income, which comes before fixed charges, increased from \$9,000,000 in 1932 to \$10,000,000 in 1936, roughly \$1,000,000. The electric revenue of the Company increased. The gross revenue increased from \$15,173,317 in 1932 to \$18,330,308 in 1936, a \$3,000,000 increase in gross revenue and \$1,000,000 increase in gross income. Gross income is the same as net operating earnings with the Company, but before bond interest and preferred stock dividends.

[fol. 140] A chart (offered and received in evidence as Complainants' Exhibit 98) shows the weekly territorial loads of Alabama Power Company—when I say “territorial loads” I mean the loads within Alabama, excluding sales to other utilities outside the state of Alabama—for the years 1935, 1936 and 1937. The red line is for the year 1937. The chart shows broadly a distinct downward trend of the load of the Alabama Power Company since the end of March, 1937. For the past several months the load of the Alabama Power Company has been substantially less than the load in 1936. At the last point on the chart for 1937, it is only slightly above the corresponding load for the same period in 1935. It is considerably lower than the load at the end of

the year 1935. There has been no reversal of the trend shown by this chart for the latter half of the year 1937, because this chart takes up to the 10th of November.

The chart (offered and received in evidence as Complainants' Exhibit 99a), taken from The Annalist of October 22, 1937, shows the curve for electric power production from 1931 to October, 1937, inclusive.

Recross-examination:

The basis of the figures shown in Complainants' Exhibit 98 are not in evidence as such, because these are weekly figures, and the figures that are in evidence are yearly figures. Those figures are confined to the State of Alabama and have no relation to sales outside of Alabama. I have no similar chart showing sales outside of the state. Exhibit 98 reflects only the loads consumed within the State of Alabama, the weekly kilowatt-hours, divided by weeks. Complainants' Exhibit 95, headed, "The Annual Revenue in [fol. 141] Kilowatt-hour Sales to Customers within the State", is likewise confined to sales to customers resident within the state or operating within the state and does not include sales to utilities or others outside of the state.

Redirect examination:

Referring to the statement "Exclusive of Magazine Generation until November 8, 1935" on Complainants' Exhibit 98, the Magazine plant of the Alabama Power Company was formerly owned by a wholly-owned subsidiary. It is an 8,000 kilowatt plant located near Mobile. At the end of 1935 it was taken into the Alabama Power Company system and the old company passed out. Any production it had was included from that date on, but would be excluded before, and it would not make any material difference in the chart because it is not large enough in proportion to the total. General business conditions in the territory served by the Alabama Power Company corresponded substantially with the trends of the Alabama Power Company business shown on Complainants' Exhibit 98.

(The witness was excused.)

[fol. 142] HENRY B. SARGENT was called as a witness on behalf of the complainants and, having been first duly sworn, was examined and testified as follows:

Direct examination:

I am 32 years old and am Vice President in charge of operations and Secretary of the Mississippi Power & Light Company, Jackson, Mississippi. (The witness' qualifications were conceded.)

The Mississippi Power & Light Company is not required under the laws of Mississippi to obtain county franchises before it may maintain wires and distribute electricity in the areas outside of the incorporated communities.

(Counsel for the complainants thereupon read into the record the following passages from the Certificate of Incorporation of the Mississippi Power & Light Company, which enumerate, among other powers of the Corporation, under Section 2, Sub-section A, "Any and all kinds of plants and systems for the manufacture, production, storage, utilization, purchase, sale, supply, transmission, distribution or disposition of electricity, natural or artificial gas, water or steam, or power produced thereby, or of ice or refrigeration of any and every kind", and, under Sub-section C of Section 2: "To purchase, acquire, develop, mine, explore, drill, hold, own and dispose of lands, interest in and rights with respect to lands and waters, and fixed and moveable property.")

In addition to its operations in the incorporated towns where it holds municipal franchises as set forth in the stipulation (Complainants' Exhibit 3), our Company also operates in 188 unincorporated communities within the State of Mississippi, and one corporate community in which we do not have a franchise, namely, Bentonia. We were operating in Bentonia before it was incorporated, which is [fol. 143] the reason why there was no franchise granted, and we have continuously served it.

As Secretary of the Company, I have charge of the payment of taxes of the Company. A tabulation (offered and received in evidence as Complainants' Exhibit 100) shows the taxes paid by the Company, the gross electric operating revenue, the gross revenue and the percentage of taxes to gross revenue, for the years 1932 through 1936, inclusive, and our estimate for the full year 1937.

The map (offered and received in evidence as Complainants' Exhibit 101) shows the State of Mississippi and superimposed thereon the electric lines of the Mississippi Power

& Light Company. The lighter blue lines are those that are over 25 kv. and those in dark blue are those under 25 kv. Also on this map municipal plants are shown in red, the generating plants of the Company are shown in squares, and there are also shown two circles using Pickwick Dam as the center of the radii, of 150 miles and 250 miles. I might add that the 2300 volt distribution lines of Mississippi Power & Light Company are not shown on the map because the scale of the map does not permit. They are indicated on the map by blue circles. We also have a few short rural lines that the scale of the map does not permit being shown. A substantial portion of our territory is also within 150 miles of Wheeler Dam and Gunter'sville Dam. There are no other private utility companies within the area that our Company serves. There are some municipally-owned plants in the territory shown on this map. They are indicated on the map by red circles.

The tabulation (offered and received in evidence as Complainants' Exhibit 102) shows the number of customers, kilowatt-hour sales, and electric revenue of the Company for the years 1933 to 1936, broken down in Zones 1 and 2. Zone 1 comprises the area enclosed by an arc having a radius of 150 miles of Pickwick Dam and Zone 2 is the area between 150 miles to 250 miles from Pickwick Dam.

[fol. 144] Our Company has interconnections with the lines of several other companies. Our interconnections are 110 kv. and 22 kv. interconnections with lines of the Louisiana Power & Light Company just south of Ozimo; 2300 volt interconnection with the lines of the Louisiana Light & Power Company at the state line just west of Natchez; 110 kv. interconnection with the lines of the Louisiana Light & Power Company west of Vicksburg, Mississippi; a 110 kv. interconnection with the lines of the Arkansas Power & Light Company west of Greenville, Mississippi; 110 kv. interconnection with the lines of the Memphis Power & Light Company north of Wells, Mississippi; a 12 kv. interconnection with the lines of the Memphis Power & Light Company north of Horn Lake, Mississippi, and a 12 kv. interconnection with the Memphis Power & Light Company north of Olive Branch, Mississippi. The Mississippi Power & Light Company has generating facilities. However, it purchases the major part of its requirements from the Louisiana Power & Light Company.

The list (offered and received in evidence as Complainants' Exhibit 103) shows the installed generating capacity of the Company plants. On the list is the location of the plants, the installed kw. capacity divided between steam and Diesel, and the total installed capacity. Four of the plants listed are run continuously, because they serve isolated areas. The generating plants at Natchez, at Liberty, at Carthage and at Mount Olive, are operated continuously to serve the load in those centers. The other plants shown on the exhibit are used only for standby service and are run when and if needed. They are not operated continuously, but are kept in condition so they can be operated when and if needed.

In addition to our electric power facilities, we serve natural gas in 24 communities in the state. We own and operate ice manufacturing systems in 5 cities in the state. We [fol. 145] own and operate a motor coach system in Jackson, Greenville and Vicksburg, Mississippi. We own and operate water works plants and distribution systems in 6 municipalities in the state, and lease and operate water-works plants and systems in 4 communities in the state.

All of the properties are operated under the same management and same supervision. They are operated as a unit and not as separate corporations. In 1936, 71 per cent of our total gross revenue was derived from the electric business. The taking away or destruction of the whole or a substantial part of the electric business would increase the cost of rendering the service of the departments that were left, because, naturally, it would have to absorb a greater portion of our general overhead and general supervision and management expenses. The probable ultimate effect would be to hamper seriously the rendering of efficient service to them.

The Company has outstanding \$16,000,000 of first mortgage, 5% bonds; 69,000 shares of non-par, \$6 cumulative first preferred stock; 35,000 shares of \$6 cumulative second preferred stock; and 1,000,000 shares of common stock, non-par value.

The Mississippi Power & Light Company, as it now exists, has grown over a period of years through consolidations and extensions of service. During this period it has brought electric service to 192 communities that formerly had no service at all. It has acquired distribution systems and

plants from 44 formerly municipally operated plants. It has brought natural gas service to 22 towns that formerly had no natural gas service whatsoever. It has, during this entire period, extended its service and furnished continuous and uninterrupted service to all of its customers. The territory that it serves is essentially a rural territory. Only one community that our Company serves has a population of over 25,000. Two hundred and seventy-three of the 312 communities that are served by the Company have a population of over 1,000, and 111 of the communities that we serve have a population of under 100. Since the very beginning of our Company, we have adopted the policy of having secondary electric lines of a voltage that was low enough to be able reasonably to render service to all customers who applied for it. In explanation of that, I might say that our system consists basically of a trunk transmission system constructed and operated at a voltage of 110,000 volts. All other lines of the Company are less than 25,000 volts, and the majority of them, aside from the 2300 volt distribution lines, operate at 13,000 volts, so that they are available throughout the territory to render service to customers who might apply for it. During this entire period, we have rendered service to everyone who has applied for it, and have extended service to all customers that were economically servable. I do not believe that there is a substantial amount of potential business in the territory that is beyond our ability to serve. I think that our Company now is serving all of the business that is economically servable. We own and operate distribution and transmission lines and stand ready at all times to serve all customers who might apply that are economically servable. There are some industrial loads that exist in our territory that we are not serving, but for the most part they are loads where the customers have process steam that they use in their manufacturing needs or they have refuse fuel that they can use to generate their own power. As far as residential and commercial customers are concerned, I think that we are serving substantially all of such customers in our territory.

The tabulation (offered and received in evidence as Complainants' Exhibit 104) shows various statistics for the Company for the years 1927 through 1936, inclusive, and [fol. 147] also for the period ending August 31, 1937. The items shown are the number of customers as of the close of

each year, the total energy sales, total industrial sales, the per cent such industrial sales bear to total sales, the miles of transmission lines, the miles of distribution lines, the average kilowatt-hour consumption per residential customer, the average revenue per residential customer and the number of communities served with electricity. (At this point the columns on the exhibit involving the Average Rate per kwh. per residential customer, and the average rate per kwh. total sales, were ordered stricken by the Court on its own motion, and exception taken.) From the date of organization of our Company through 1936, our Company has made net additions to the plant amounting to \$15,110,405. Under the state laws of Mississippi, the municipalities have the authority to regulate the rates of utilities within their corporate limits. We are subject to that authority.

Cross-examination:

The Company has some \$16,000,000 in bonds outstanding, but I am not familiar with the prices of those bonds in the last three or four years. It sounds reasonable to me that the bonds may have been quoted at \$100 during 1936, the highest price in the last six years, but I have not seen the quotation.

Complainants' Exhibit 104 shows the average consumption for residential customers in the twelve months ending August 31, 1937 to be 737 kilowatt-hours. That is the best record in the history of the Company.

I do not know of any contracts of the TVA to sell power to municipalities or other customers in the claimed territory of my Company, but there is a contract that the TVA has with the city of Memphis which will affect the contract under which we sell power to the Memphis Power & Light Company, because if the municipality of Memphis constructs its system and takes the load away from Memphis Power & Light Company, our sale of power to Memphis Power & [fol. 148] Light Company under our contract with them will probably be cancelled. We have a lot of power to sell. Our Company buys the major portion of the power that it sells. We have a firm power contract with the Louisiana Power & Light Company under which they provide us with all of the power that we need, so we have plenty of power to sell. We buy 95% of the power that we sell. There is now being constructed by the TVA a line into the territory that we

serve, to serve a load which we are now serving. The load which we are now serving is the Government Engineer Project about 8 miles east of Sardis, where they are constructing a dam, and the TVA is constructing a line to take that load; when the line is completed, we will no longer serve that load. I think I am pretty familiar with that transaction. I believe the line is the line of the War Department, not of the TVA, but it will be used for receiving TVA power. I do not know that that line of the War Department which is now being constructed to serve its construction needs at the Sardis Dam will have as its point of delivery Pontotoc, Mississippi, in the so-called ceded area in north-east Mississippi.

There still are large rural areas in the territory we claim that had no service in 1933. In answer to the question whether I agree with the statistics of the Edison Electric Institute that in 1933 less than one per cent of the farms of Mississippi had central station service, I think that the figures that the Edison Electric Institute puts out in showing the farms served are accurate, provided that they are properly qualified so that those who look at it know what it means. Now, if an explanation is made as to what a farm consists of, under that statement of statistics that is put out, why, yes. I don't know that I know what the Edison Electric Institute means by "farms", because there are various and sundry definitions of farms.

We did not sell any power to the Memphis Power & Light [fol. 149] Company in 1936. The contract which I referred to is the contract which was negotiated and entered into in June, 1937.

(The witness was excused.)

OFFERS IN EVIDENCE

Thereupon counsel for complainants had marked for identification as Complainants' Exhibit 105, House Document 328, 71st Congress, Second Session, entitled "Tennessee River and tributaries, North Carolina, Tennessee, Alabama and Kentucky, covering navigation, flood control, power development and irrigation, Part 1".

"Mr. Fitts: May it please the Court, if the report is offered merely for the purpose of showing that it is a report

that was made by the Army Engineers to Congress, and that is the report that was before Congress, that that is the information that was before Congress, there is no objection.

However, there is an objection if the report is offered to prove the truth of, or the accuracy of the facts asserted in it, on the ground that as to that it would still be hearsay.

.

Judge Allen: The Court will receive the report in evidence and will give it consideration as it would any report.

Mr. S. D. L. Jackson: At this time I would like to read a few brief paragraphs from this exhibit, from pages 1 to 7, which is the report of the Chief of Engineers.

Mr. R. T. Jackson: May I interrupt one moment? It was our thought, if the Court please, where we offer excerpts specially in this way from any documentary evidence, as to which there might not be sufficient copies of the document, that we would ask the reporter to make for immediate distribution an extra copy, so that those would be delivered to each of the members of the Court for their convenience.

Judge Allen: I think the Court will probably consider the entire report. We would be very glad to have a copy of the excerpts.

Mr. R. T. Jackson: We merely wanted to bring the parts that we offer, of course, what else is offered or considered—

Judge Allen: We would be very glad to have the copy [fol. 150] of the excerpts. Speaking for myself, I shall look at the whole report.

Mr. R. T. Jackson: We offer these parts that we think material."

Counsel for complainants then read and offered in evidence the following excerpts from House Document 328; from the report of the Chief of Engineers, paragraph 8 on page 2, paragraph 10 on page 3, paragraph 16 on pages 4 and 5, paragraph 17 on page 5, paragraph 23 on page 6, and paragraph 24(a) on page 7; from the report of the Board of Engineers which is attached to the report of the Chief of Engineers, the first 6 lines from paragraph 21 on page 16; and from the report of the District Engineer attached to and made a part of the report of the Chief of Engineers, the third paragraph on page 88, paragraph 78 on page 97

and paragraphs 79 and 80 on pages 100 and 101. Counsel for complainants also offered in evidence as Complainants' Exhibit 105(A) the table appearing on pages 98 and 99 of Complainants' Exhibit 105, and as Complainants' Exhibit 105(B) the table appearing on page 100.

"Mr. Fitts: May it please the Court, while I have not made any formal objection, it does seem to me that this fragmentary way of getting in—I realize that the whole report is in evidence and that is why I have not made any formal objection, but I do hope when the time comes to make up a record in this case we will be permitted to put the fragments together, rather than to have them appear segmented like this where they read in a distorted and misleading picture of what both the chief and the district engineer reported. I think it is confusing to have them in the record in that fragmentary way at this time.

Judge Allen: The Counsel for the TVA will have the same right to pick out certain parts of this report that they wish to rely upon as counsel for the complainants, and it may follow immediately after this testimony.

.

Judge Allen: The Court thinks it would be of assistance if counsel for the Authority would now read what part the Authority would rely on in document No. 328.

Judge Martin: Of course, what the Court had in mind was to consider the one document in its salient features from both the Complainants' and Defendants' standpoints, and have pointed out to us and read to us such portions as complainants and defendants think pertinent here before we consider some other document.

Mr. S. D. L. Jackson: So long as it clearly appears in the record that that is the defendants' excerpts that they are [fol. 151] calling the Court's attention to and not in any wise connected with the complainants' case, we have no objection. As Mr. Raymond Jackson points out, which is the fact, we have only marked the exhibit for identification and have only offered in evidence the paragraphs which I read.

Judge Allen: The Court will receive the entire report. The Court will take judicial notice of the entire report, and the Court will receive it.

Mr. S. D. L. Jackson: May we have an exception to that? We only desire to offer as part of our case the paragraphs

that were read to the Court, although the entire exhibit was marked as an exhibit for identification."

Counsel for complainants then read from the Rivers and Harbors Act, Public Act No. 520, 71st Congress, approved July 3, 1930, the first paragraph:

"Be it enacted by the Senate and House of Representatives of the United States of America in Congress Assembled, That the following works of improvement are hereby adopted and authorized, to be prosecuted under the direction of the Secretary of War and supervision of the Chief of Engineers, in accordance with the plans recommended in the reports hereinafter designated."

Counsel further read from pages 11 and 12 of that Act as follows:

"The project for the permanent improvement of the main stream of the Tennessee River for a navigable depth of nine feet in accordance with the recommendations of the Chief of Engineers in House Document numbered 328 of the Seventy-first Congress, Second Session, is hereby authorized; Provided, That an expenditure of \$5,000,000 shall be authorized to be appropriated for the prosecution of work under this project: Provided further, That the Chief of Engineers is hereby directed to ascertain and report to Congress on the first day of the first regular session of the Seventy-Second Congress, advising the prospective cooperation offered by responsible interests under the Federal Water Power Act, in the program of construction recommended by the Chief of Engineers, providing for the nine-foot project by means of high dams."

Counsel for complainants then had marked for identification as Complainants' Exhibit No. 106, Part I of the Annual Report of the Chief of Engineers, U. S. Army, 1932.

[fol. 152] "Mr. S. D. L. Jackson: I want to read in evidence after it is marked one paragraph and offer to the Court a table similar to that other photostat table.

Mr. Fitts: I am assuming that the Court's ruling will be the same here. We object to the fragmentary offer of the report. If any part is in, I think it all ought to be put in, for what it is worth.

Judge Allen: The Court will receive the whole report.

Mr. S. D. L. Jackson: May it be clearly understood that we are only offering the one paragraph and the tables which relate to the Tennessee River. This, of course, takes in every river in the United States.

Mr. R. T. Jackson: May I make one suggestion about that report? That report is the annual report of the Chief of Engineers which refers to all the adopted projects on all the rivers of the United States, and there is, therefore, only one small part which can have any reference to the Tennessee River and its tributaries. For that reason we are offering excerpts.

Judge Allen: The Court will accept the entire report and will consider what part of the report is pertinent and what parts of the various matters contained in this volume are pertinent. The Court will not accept fragments of a report and be bound by those fragments. We will be glad to hear the paragraphs or whatever paragraphs you pick out."

Counsel for complainants then offered in evidence from this report the paragraphs on Page 1206 entitled "Existing Project" which relates to the Tennessee River, and the table on Pages 1207 and 1208 which was marked for identification Complainants' Exhibit 106(A).

Counsel for complainants then had marked for identification as Complainants' Exhibit 107, Part I of the Report of the Chief of Engineers of the United States Army for the year 1936. From that exhibit counsel for complainants offered in evidence the paragraphs appearing on Page 1032 entitled "Existing Project" which relates to the Tennessee River, and the table on Pages 1033 and 1034 which was marked as Complainants' Exhibit 107(A).

"Mr. Fitts: For the purpose of the record, we assume that any part of this report which is relevant in the issues in the case is in evidence.

Mr. S. D. L. Jackson: We have not offered it.

[fol. 153] Judge Allen: That is the ruling of the Court.

Mr. S. D. L. Jackson: May we have an exception? That is part of the defendants' case, as I understand it.

Judge Allen: The Court considers that it can take judicial notice of these reports, of the entire report.

Mr. S. D. L. Jackson: That may be, if your honor please, but we simply are trying to preserve our record and we want the record to show that we offer those parts which we have read.

Judge Allen: That is satisfactory. And the Court wishes the record to show that we can take judicial notice of the entire report, and the Court does not care to be bound by fragmentary parts of the report offered in evidence."

Thereupon counsel for complainants had marked for identification as Complainants' Exhibit 108 the hearings before the Sub-committee of the House Committee on Appropriations in the Fourth Deficiency Appropriations Bill for 1933, Seventy-Third Congress, First Session.

"**Mr. Fitts:** Are you offering the whole document?

Mr. S. D. L. Jackson: I have not offered any of it yet, **Mr. Fitts.** I am having it marked as an exhibit for identification at this time.

Mr. Fitts: All right.

Mr. S. D. L. Jackson: The Complainants offer in evidence from this document the portion on page 23, being statements of Dr. Arthur E. Morgan, President, Tennessee Valley Authority, as follows:

Mr. Fitts: May it please the Court, before that is read, I think I have a right to get in the objection which I think is well taken.

I object to the offer of this material in evidence in this case upon the ground that it is immaterial and irrelevant; upon the second ground that it is the individual statement of an individual director, not reflecting any action taken by the corporation as such; that in so far as it is offered to prove the truth of facts stated in it, it is hearsay evidence. This is a hearing before an Appropriations Committee; even testimony in court in another proceeding would not be admissible. This is not an official report to Congress by an official officer acting pursuant to his official duties, not an official record. It is not within any of the recognized exceptions to the hearsay rule; it is pure hearsay, an individual's statement, on the same plane as far as I can see, so far as its quality as evidence or proof is concerned, as magazine articles or books or speeches, and expressing individual views.

Mr. S. D. L. Jackson: If the Court please—

Mr. Fitts: And furthermore, and probably more important, it can only go to the question of motives or purpose of the directors of the Authority and cannot go to the question of the existence of statutory or constitutional power to take the action that it challenged in this case."

There followed a long colloquy between court and counsel of both sides and arguments of counsel concerning the admissibility of this evidence.

"Judge Allen: Mr. Jackson, the Court will ask you to indicate what excerpts from this statement of Dr. Morgan you are referring to."

Counsel for complainants then offered and read in evidence the following excerpts from Complainants' Exhibit 108 for identification: On Page 23 beginning with the statement of The Chairman, "Out of this" and concluding with the statement of Dr. Morgan ending "above Muscle Shoals"; on Page 25 the questions of Mr. Collins and the answers of Dr. Morgan thereto; on Page 28 the remarks of Mr. Oliver under the heading of "Transmission Lines" and the replies of Dr. Morgan thereto; on Page 29 the question of Mr. Arnold beginning "Referring to the transmission line" and the reply of Dr. Morgan thereto; on Page 30 beginning with the statement of Dr. Morgan: "And another thing" down to the heading "Transmission Lines and Distributing Systems".

"Mr. S. D. L. Jackson: Now, those are all of the portions out of this exhibit 108 that the complainants desire to offer in evidence.

Judge Allen: The Court has previously held that under the Supreme Court's decision in the Ashwander case, evidence as to motives, declarations, pronouncements, desires, [fol. 155] policies, and the programs is not admissible. The Court adheres to this ruling. This means that the Court considers evidence of speeches, releases to the newspapers, circulars, or statements of a similar character, made by the directors and employees of the Tennessee Valley Authority as incompetent and irrelevant.

Since the reports of sub-committees of Congress, and statements of members in charge of legislation are held competent, the Court rules that this particular exhibit is admissible for whatever weight it may have, because it embodies a statement made by the head of the Authority to the Committee of Congress in charge of the appropriations for the Authority and falls into the classification of a quasi-official report to Congress. The excerpts are admitted.

Mr. S. D. L. Jackson: I understand that these excerpts are admitted. May we have an exception to the first part of your Honor's ruling?

Judge Allen: You may have it.

Mr. S. D. L. Jackson: On that point, if your Honor please, I think your Honor mentioned press releases and things of that character which were not involved in the argument that we made. May we present additional authority to your Honor?

Judge Allen: The Court is desirous of aiding counsel in the presentation of evidence in this case. The petition embodied as exhibits numerous copies of alleged press releases, speeches, statements, circulars and things of that sort. The Court desires to indicate to counsel its ruling with reference to those matters in order that there may be no misunderstanding and no loss of time.

Mr. R. T. Jackson: May we submit our brief on that point, since we had not supposed it would be involved at this time?

Judge Allen: The Court has ruled upon this point at Nashville, the Court ruled again upon the point after the meeting at Nashville, the Court ruled upon this point upon arrival in Chattanooga, and the Court now rules upon this point, and it does so in advance in order that there may be no misunderstanding on the part of counsel and no waste of time to the inconvenience of all concerned, and you may have your exception."

At this time counsel for defendants read the following excerpts from House Document 328, Complainants' Exhibit 105 (which excerpts are set forth in Appendix A following Defendants' Exhibits):

From the report of the Board of Engineers for Rivers and Harbors under the heading "Discussion by the Board of Engineers for Rivers and Harbors, Paragraph 33 on [fol. 156] Page 19 and the last sentence of Paragraph 35 on Page 21; from the report of the Board of Engineers for Rivers and Harbors under the heading "Summary of the report of the District Engineer", Paragraph 5 on Page 10, the first sentence of Paragraph 11 on Page 11, the first two sentences of Paragraph 13 on Page 12, Paragraph 23 on Page 16, and Paragraph 25 on Page 17 including only the description of Cases I, II and III and including only

the figures in the table at the bottom of the page for Knoxville and Chattanooga in Cases I, II and III; from the report of the District Engineer, the sentence from Paragraph 31 on Page 64, reading "The series of low dams for navigation only provide no flood control" and Paragraphs 5, 6 and 7 of Appendix G on Page 496.

Counsel for defendants then read from the Annual Report of the Chief of Engineers for 1936, Complainants' Exhibit 107, the fourth paragraph on Page 1035 (which excerpt is set forth in Appendix B following Defendants' Exhibits).

"Judge Allen: Before ruling upon the application for subpoena duces tecum the Court desires to ask for certain further information from counsel. In the first place, the resolutions which were agreed to be delivered, have they been delivered?

Mr. Fly: They have been delivered, your Honor.

Mr. S. D. L. Jackson: If the Court please, we received about noon on Saturday, I think, a list of something over 100 resolutions.

Mr. Fly: 367.

Mr. S. D. L. Jackson: I received 192, I believe, in the first list, but a great number of those resolutions referred to an exhibit, for instance, the resolution reads, 'resolved that the project or plan or whatever it is, set up in exhibit numbered so and so, and attached to these minutes is hereby approved.'

A number of the exhibits were not attached and did not accompany the resolution, so the resolution is quite unintelligible.

We received more yesterday. We have not fully completed our check of them, but I think we can assure the Court that if that is the material that they are going to [fol. 156a] furnish, and all that they are going to furnish, it does not meet the material that we requested in our subpoena duces tecum.

Judge Allen: Have you received any of the exhibits to which the resolutions refer?

Mr. S. D. L. Jackson: I don't believe so. I have not fully completed my check of this material that came in yesterday. But there were no exhibits attached to the first group of resolutions. Mr. Marks and I have had some conversation and hoped to get together sometime either last

night or today, and we did not make it last night, to try to iron out some of these exhibits.

He has assured me that some of the exhibits are being made up, and copies will be sent over. That is as I understand it,—is that correct, Mr. Marks.

Mr. Fly: May it please the Court, I believe that Mr. Jackson is quite correct, except in so far as he may suggest that we were unwilling to give him the exhibits which are necessary to an understanding of the resolutions.

It is true that some of the resolutions authorize a particular project covered by a particular exhibit. Now, we are prepared to turn those exhibits over to him, and I understand that they will cooperate with us in going over those.

Judge Allen: Have all of the contracts which were agreed to be delivered, have they all been delivered?

Mr. Fly: I think they have all of the contracts. If they have not, if they will inform us, name those that are missing, we will be glad to give them those.

Mr. S. D. L. Jackson: So far as I know now, the only one missing,—and perhaps we have mislaid it since we received it from the TVA,—is the contract with the Gibson County Membership Cooperative Association.

Mr. Fly: We will look that up and give you another copy.

Judge Allen: We are interested in the question of the Electric Home and Farm Authority and desire further information concerning that corporation. Is it conceded that that corporation is no longer in existence?

Mr. S. D. L. Jackson: Not exactly that way, if your Honor please. But there is in existence a successor corporation which took over all of the liabilities, rights and assets of the first corporation, I take it, and is carrying on to a large extent the business of the first corporation.

Judge Allen: What is the name of that corporation?

[fol. 156b] Mr. S. D. L. Jackson: Electric Home and Farm Authority, Incorporated, or 'Inc.' The second one was organized, I think, in August of 1935 as a Delaware Corporation, and was the Electric Home and Farm Authority. May I state it is carrying on with the TVA under the same contract that the original corporation made, that the TVA was carrying on under.

Judge Allen: Do you contend that the TVA is selling electric appliances retail, is directly selling electric appliances at retail?

Mr. S. D. L. Jackson: No.

Judge Allen: All right, that answers that question. Do you contend that any of the directors of the new corporation are directors of the TVA?

Mr. S. D. L. Jackson: We don't know. I don't think they are.

Judge Allen: Well, you don't think they are.

Mr. Fly: They are not, your Honor; there is no doubt of that. No one connected with the TVA is a director or employee.

Judge Allen: Now, what exactly and specifically do you contend for the relationship between this new corporation,—not the old one, the new corporation, and the TVA?

Mr. S. D. L. Jackson: This, if your Honor please: The Electric Home and Farm Authority is still engaged in financing the purchase of electric facilities.

Now, in order to state the situation coherently, if I may refer back a moment to the original corporation, that started in the TVA area, it started as an adjunct of TVA. TVA referred to it as an agency to accomplish that particular purpose, namely, to stimulate the sale of electricity consuming appliances, load building. Now that developed first in this area down here, I think originally for TVA itself. Then it embraced, its field was enlarged so that it would do the same thing for private utilities, when the TVA had approved, or EH&FA had approved the rates at which the private utilities were selling current.

Judge Allen: Mr. Jackson, I think every member of the Court, in fact I am sure that every member of the Court has read the exhibits attached to the bill and those exhibits set out what you are now saying. Our question is directed, specifically directed, to what you can prove concerning the connection, actual connection between TVA and this new corporation.

Mr. Jackson: The new E. H. & F. A., we expect to show that it is carrying on the business of the original E. H. & F. A., and so far as the TVA at the present is concerned, it has this contract with TVA, just as it has a contract with [fol. 156c] other utilities whose rates are satisfactory to it, and TVA is now engaged in collecting funds from the

purchasers of electric consuming appliances, and I presume remitting those funds to E. H. & F. A. That is, E. H. & F. A. is still furnishing a financing service to people who buy electric consuming devices, and by whom TVA current is used. I mean TVA current, perhaps purchased through purchasers of wholesale current, which goes out and is consumed. TVA actually collects the funds on the purchaser's light bill and remits to E. H. & F. A. That is our point here, if your Honor please, that TVA has used, and is using E. H. & F. A. even today to promote their electric utility business.

Judge Allen: Do you want to say anything about that, Mr. Fly, before going to other subjects?

Mr. Fly: May it please the Court, I think Mr. Jackson on the whole is correct in his statement. The first corporation was under the control of the directors of the Tennessee Valley Authority before the decision in the Ashwander case, I have forgotten when it was. That corporation was dissolved. That was a Delaware Corporation. The new corporation was organized under the laws of the District of Columbia. The directors of that corporation I believe are all employees of the Reconstruction Finance Corporation. The only business of the E. H. & F. A. is a financing business, assisting purchasers of electric appliances throughout the country. Now, we have no control, there is no interlocking directorate, there are no common employees or anything of that sort. Now, it has these contracts with the various utilities, including these complainants in various areas, and in that way the E. H. & F. A., under the spending power is assisting the purchasers of electric appliances in financing those.

Now, it is true that the Tennessee Valley Authority has a contract with the E. H. & F. A., just as these complainants have. It is not true, of course, that we have any extensive relations with them, because as your Honor knows we have very few direct customers, and most of that was carried on by the wholesale purchasers from TVA who are in the distribution business.

Mr. S. D. L. Jackson: Our point is this, if your Honor please, that E. H. & F. A. is still being used to promote the utility business of TVA, that is, still going on.

Judge Allen: Now, the Court wants to ask questions concerning the request for certain items in this citation for a

subpoena duces tecum. Perhaps there are a number of questions we might want to ask counsel, and counsel might want to look at the subpoena on page 4, the last item on that page. The Court is drawing from complainants, what is the subject and nature of the telegram asked for from Mayor Glenn of Florence, Alabama, addressed to TVA.

Mr. S. D. L. Jackson: Would your Honor give me the date of that?

[fol. 156d] Judge Allen: December 4, 1932 and reply.

Mr. S. D. L. Jackson: Oh, that telegram from Mayor Glenn to the TVA was advising the TVA that the city of Florence had filed an application for a PWA loan with the Alabama State Board of Public Works, I think a few days before, and that they were asking TVA for their assistance and cooperation in getting speed from that loan. Trying first, to get it from the Montgomery office, the State Board, down to Washington, to get further action. The reply to that telegram was a telegram from Mr. Lilienthal assuring them that he would do so. Next is a letter, I believe next in line is the letter of December 7th, is a letter again assuring them that he was actively engaged in trying to speed up that application, and that he, Mr. Lilienthal had an appointment with Secretary Ickes the next day and would discuss that with him among other matters.

Judge Allen: What is the nature of the telegram dated about December 27th to Mayor Glenn?

Mr. S. D. L. Jackson: That is advising Mayor Glenn that his application had been received at Washington office of PWA, that is the Alabama State Board had sent it down to the Washington office.

Judge Allen: And the letter dated January 4, 1934, from Director Lilienthal to Mayor Glenn of Florence, Alabama.

Mr. S. D. L. Jackson: On that question I am not so sure as to just the precise contents of that at this time. I think if your Honor please, that relates to the PWA application of Florence, no doubt about that, and I think that is the one advising that they think they can get that application granted in the near future. I am not quite positive as to my recital of the substance of that.

Judge Allen: Now, the telegram dated on or about January 4, 1934 from director Lilienthal to Sheffield and Tusculumbia, Alabama, stating PWA loans would be released, that refers to loans applied for by those cities?

Mr. S. D. L. Jackson: Yes, your Honor.

Judge Allen: What is the nature of the letter dated on or about March 6, 1934 from Mayor Glenn of Florence, to Director Lilienthal?

Mr. S. D. L. Jackson: That, I think Mayor Glenn of Florence was becoming a bit impatient, and that they were not getting this loan through faster. Now this letter of March 6th and one of March 8th and reply of March 10th and the letter of March 11th are all somewhat general in their nature. I mean, it is Mayor Glenn trying to press the Florence PWA application and trying to get TVA to speed things up down at the PWA just as much as they possibly could.

[fol. 156e] Judge Allen: Now, skipping the next item, what is the nature of the letter dated on or about March 19, 1934?

Mr. S. D. L. Jackson: That is a letter, if the Court please, wherein Mr. Lilienthal advised Mayor Glenn that the things were going along just as fast as they could, that Mr. Lilienthal had hit upon a plan which might circumvent a legal objection that somebody in the legal department of PWA had raised, that these Alabama cities could not—that any bonds that they issued would not be good, so that the PWA could take them under the Act under which PWA was acting, and Mr. Lilienthal at that time advised Mayor Glenn that he had hit upon an idea which might circumvent that idea, and was trying to work it out. I believe he either wrote it from Washington or said he was going to Washington shortly, and try to work that plan out, but he had discussed that plan in part with Secretary Ickes, and Secretary Ickes said he saw no objection in principle to the proposal—I mean to say that proposal was ultimately carried out for fourteen North Alabama towns in July of that year.

Judge Allen: What is the nature of the telegram dated on or about July 9, 1934 from the Mayor of Tuscombua, Alabama to Director Lilienthal?

Mr. S. D. L. Jackson: June 19th?

Judge Allen: Yes, at the bottom of page 5.

Mr. S. D. L. Jackson: That relates to the application of Tuscombua for a PWA loan, and at the moment, if your Honor please, I do not recall the precise contents. It is involved with this other situation. I will have a memorandum of that shortly.

Judge Allen: And I suppose the same comment would be true with reference to the first item on page 6, the telegram.

Mr. S. D. L. Jackson: The telegram dated June 20th, 1934?

Judge Allen: Yes.

Mr. S. D. L. Jackson: Yes, I think that a telegram practically identical to that, or that identical telegram was sent to the mayor of those two towns.

Judge Allen: Now, what is the nature of the telegram dated June 21st, 1934, to Mayor Glenn of Florence?

Mr. S. D. L. Jackson: That also deals with the PWA application of Florence. I do not recall the exact substance of that precise telegram. I will have a note of it here in a moment, of what it was.

By that time the city of Florence had indicated that it wanted to build its own distribution system, and Mr. Lilienthal's plan, the one I mentioned to you, and which is hinted [fol. 156f] at in the letter of March 19th was that although these PWA loans would be used, or the applications would be there, and it was a back log, yet the plan he was trying to work out to avoid any legal difficulty about bonds was that TVA would buy the facilities of the Alabama Power Company in these various towns and sell them back to the town, which under the plan of paying for them out of revenue rather than having the towns issue bonds and sell them to PWA, was holding the PWA applications in line as a feature of the bargain.

Judge Allen: Now, what is the nature of the telegram of July 10, 1934?

Mr. S. D. L. Jackson: Well, that telegram is the one in which they said to Mayor Glenn, who by that time had made up his mind that they did not want to buy the property of the Alabama Power Company in Florence, they wanted to build their own plant, and that telegram was the one that said that was inconsistent with the plan TVA had on this thing, and Florence would have to get in line along with these other towns.

And then that is followed up with the letter, or the telegram of July 11th from Mr. Ickes to Florence, which is pleaded in our bill, and admitted in the answer.

Judge Allen: Yes, that is pleaded in the bill. What is the nature of the letter dated October 15, 1934 from Director Lilienthal to Mayor Overton of Memphis?

Mr. S. D. L. Jackson: Our only knowledge of that, if your Honor please, appears from a newspaper report which is to the effect that Mayor Overton of Memphis had been advised by Mr. Lilienthal at some time, I would say within a week or ten days prior to that date, that TVA would, I think, probably give consideration to the purchase of the steam plant at Memphis in the event Memphis contracted with TVA and acquired the distribution facilities of the Memphis Power & Light Company, or else built their own.

Judge Allen: Now, looking down at the bottom of page 6, Mr. Jackson, please, the third item from the bottom, what is the nature of the letter that you claim dated on or about August 13, 1937, from Director Lilienthal to Dempster.

Mr. S. D. L. Jackson: That relates to the City of Knoxville. You see, if I might say, Knoxville had had a PWA loan and grant for a long time. They had tried to work out this plan in 1934 to buy the property of the Tennessee Public Service Company and that had not gone through, and the situation had reached more or less the stage in Knoxville where things were rather dormant.

And that letter, the letter of August 13th, Mr. Lilienthal wrote to Knoxville and wanted to know when they were [fol. 156g] going to act. That is, it simply brought the thing to life after it had been simmering for some little time.

The other two letters relating to Knoxville relate that Knoxville very promptly did act. That is, they had their survey made, and things of that kind.

Judge Allen: Now, the Court understands that the maps and tabulations asked for in paragraphs 8 and 9 on page 8 have been delivered.

Mr. S. D. L. Jackson: We have received them and Mr.

— Mr. Seymour, do you know if the final check has been made on those?

Mr. Seymour: That is the maps of the TVA lines?

Mr. S. D. L. Jackson: Yes.

Mr. Seymour: They are now being corrected for some more or less minor errors that were agreed upon. They are not actually delivered, but we expect to have those completed shortly.

Mr. Marks: I may say I tried to reach counsel for the complainants yesterday on that matter but was unable to.

Mr. Seymour: If the Court please, I think those should be considered out of the thing. We are going to agree on it, it is merely a matter of time, working out the errors.

Judge Martin: That was understood.

Mr. S. D. L. Jackson. Yes.

Judge Allen: That was the understanding, but in our rulings, we wanted to make sure of that.

Mr. S. D. L. Jackson: Yes.

(A brief conference was held by the Court.)

Judge Allen: The Court would like to know whether complainants will offer proof tending to show that the TVA is still employing or contributing to the wages of George Munger as sales manager of the Electric Home and Farm, Incorporated? Is he connected with the new corporation?

Mr. S. D. L. Jackson: If you- Honor please, I don't know.

Judge Allen: Then you are not prepared to show that.

Mr. Fly: We can state what the facts, what the situation is. Mr. Munger is a regular employee of the Electric Home and Farm Authority, and the TVA bears no portion of any expense of the EH&FA, including, of course, Mr. Munger's salary.

[fol. 156h] Mr. S. D. L. Jackson: I might say I think that minute relates back to some time in the Spring of 1934.

Mr. Fly: Pardon me, your Honor, I made a misstatement. I understand Mr. Munger is with the Rural Electrification Administration; I am sorry.

At this point the Court announced its ruling upon the application for subpoena duces tecum made by complainants on the second day of trial.

Judge Allen: Judge Gore has previously stated in his ruling on the motion to dismiss the bill that the bill is in some particulars argumentative, and that it contains impertinent matters. The Court of Appeals of the Sixth Circuit in effect sustained the trial court in his ruling upon that question. The other members of this Court are in accord with Judge Gore's view. We do not, therefore, agree with counsel for complainants that every fact or circumstance alleged in the bill, or that every conclusion of fact drawn therefrom, constitute an issue in the case. The scope of the issues and competency, materiality and relevancy of evidence will be decided by the Court under the law applicable to the facts alleged.

RULING UPON APPLICATION FOR SUBPOENA DUCES TECUM

With reference to the application for subpoena duces tecum. This application prays for the production of very many items of documentary evidence listed by groups in some eight typewritten pages. The Court, so far as possible, will consider these items under their natural classification.

[fol. 157]

I

We are informed that copies of all resolutions of the Authority dealing with the sale of electric energy and copies of all contracts for such sale have been given complainants by the Authority. Certain of the requests to produce in paragraph 1 of the application are very broad. They pray for the production of minutes of the Authority which 'discuss' or 'consider' or 'approve' certain action of the Board with reference to the sale of electric power. As to approval officially expressed in resolutions, such papers have been given to complainants. As to documents, papers, et cetera, which merely show consideration, discussion, plan and pronouncement, such items fall within our previous ruling, to which we again adhere. The Court has previously held that under the Supreme Court's decision in *Ashwander versus Tennessee Valley Authority*, 297 U. S., 288, evidence as to the pronouncements, policies and program of the TVA and its directors, their motives, and desires, does not give rise to a justiciable controversy save as they had fruition in action of a definite and concrete character constituting an actual or threatened interference with complainants' rights, hence evidence upon such subjects is inadmissible. In *Isbrandtsen-Moller Co., Inc., versus United States*, 300 U. S., 139, 145, the Supreme Court reaffirmed this principle. This ruling necessarily results in a denial of the application for subpoena duces tecum in so far as it relates to all documents of this nature. Evidence of speeches, releases to the papers, circulars, and statements of a similar nature made by the directors or employees of the TVA is incompetent and irrelevant.

II

Certain of the requests call in extremely sweeping terms for communications, reports, etc., which have passed between the TVA and various Government agencies, Federal Emergency Administration of Public Works, Rural Electric-

fication Administration, and National Power Policy Committee. These communications and negotiations have no bearing upon the controversy presented here. The constitutionality of the statute under which these agencies operate is not here contested. If they were attacked before us, the statute requires us to give notice to the Attorney General of the United States. In the absence of any such question, we must assume their validity. The presumption of validity which attaches to the performance of official functions by duly constituted offices of the Government exist here also as to the acts of officials of these Governmental agencies. We have no jurisdiction in this case to question their legality. A double presumption of that validity thus arises as to the acts of these agencies, Federal Emergency Administration of Public Works, Rural Electrification Administration, and National Power Policy Committee, of which evidence is prayed to be produced. Since the documents in question have bearing, if at all, upon the allegations of conspiracy, and since a conspiracy is an agreement to perform an unlawful act, or an agreement to perform a lawful act in an unlawful manner, these documents are not relevant. The negotiations between the municipalities and the cooperatives and the TVA stand upon the same footing. The contracts themselves are in evidence. Under the state law, so far as appears, the municipalities are authorized to generate and transmit and sell power and to contract for its purchase. The cooperatives may legally purchase power from TVA. Hence no illegal act is involved in the acts with reference to which evidence on this subject is prayed to be produced, and this portion of the application is denied.

III

The Court has heretofore ruled, and now adheres to its ruling, that evidence as to the rates of any litigant has no relevance. It is not a rate proceeding. The prayers to produce certain documents giving information as to rates therefore is denied.

III-A

The request for subpoena duces tecum as to all documents relating to communications between Electric Home and Farm Authority, Inc., and TVA is refused. This corpora-

tion has been dissolved for over two years and counsel for complainants do not state that they can show any control of Electrical Home and Farm Authority as now constituted by TVA.

IV

The application, except as hereinafter stated, must fail because of its sweeping and burdensome character. While certain items are specifically described, these bear upon the question of motive, plan or program, heretofore ruled upon. Most of the requests embodied in these eight typewritten pages are far too sweeping to be regarded as reasonable. The application for subpoena duces tecum in these general requests does not require the production of documents of a limited character, but in a dragnet prayer demands written evidence of negotiations, discussions, reports to TVA from Federal Emergency Administration of Public Works, Rural Electrification Administration, and National Policy Committee, and correspondence between these agencies and TVA and between TVA and numerous municipalities and cooperatives. As heretofore stated in our ruling upon the previous application for subpoena duces tecum, these requests constitute a fishing expedition. It is difficult to see [fol. 159] how the TVA business 'could be carried on after it had been denuded of this mass of material which is not shown to be necessary in the prosecution of this case and is clearly in violation of the general principle of law with regard to the particularity required in the description of documents necessary to a search warrant or subpoena'. *Hale versus Henkel*, 201 U. S., 43, 76, 77; *Federal Trade Commission versus American Tobacco Company*, 264 U. S. 298.

V

The application for issuance for subpoena duces tecum for the following documents and papers is allowed:

- (1) Minutes of June 26th, 1933, so far as they relate to the opposition of the TVA Board to the granting of further licenses in the Tennessee River Basin.
- (2) Minutes of May 20, 1934, relating to the same subject.
- (3) Minutes of September 14, 1937, showing assignments of contract with Volunteer Portland Cement Company to the City of Knoxville.

(4) Copy of protest dated on or about August 23, 1933 to Federal Power Commission from TVA Director Lilienthal objecting to the granting of a license to the Southern Industries and Utilities, Inc.

(5) Copy of letter dated on or about May 21, 1934, from TVA to Federal Power Commission.

The application of the issuance for the subpoena duces tecum as to all other documents, papers and material listed in the application, except those as to which the application has been already granted, is denied.

Judge Allen: Counsel for the complainants may have their exception.

Mr. R. T. Jackson: May we ask the Court whether it will be necessary for us to file more limited subpoenas covering only certain parts of the material asked for in the subpoena upon which the Court has just ruled in order to preserve our rights on the record?

We had thought to, but found there was not time in the filing of our brief, to submit at that time several subpoenas which would break up this material and avoid any possible objection on the ground that it was too sweeping and too all-inclusive.

If that is necessary in order to preserve our rights on the record, we would like to have the opportunity of filing several subpoenas covering the same ground, segregating the material, and then permitting the record to be made in that way.

Judge Allen: The Court feels that apart from that part of the rulings embodied in paragraph 4 which discusses the question of its sweeping and burdensome character, on the request for items prayed for, that the Court in this ruling has disposed of every item prayed for. That ruling stands.

Mr. R. T. Jackson: I so understand it, your Honor. The only point is in perfecting our record it appeared to me that the point in regard to the sweeping character of the subpoena was also assigned as a sufficient reason, had the Court chosen not to go further.

Hence, if that is true, it would be sufficient on any review, and we would not want to have our record defective in that respect by failing to file in that manner.

Judge Allen: The Court won't indicate to excellent counsel what they shall do.

Mr. R. T. Jackson: We will do that. We merely did not want to burden the Court with further protecting the record.

Mr. S. D. L. Jackson: On the record please show we reserve an exception to the Court's ruling announced from the bench a moment ago to which we were allowed exceptions by the ruling of the Court."

OFFERS IN EVIDENCE

Thereupon two verified statements previously filed with the Court with reference to the relevancy, materiality and competency of the minutes of the TVA, described in Paragraph 1 of the subpoena duces tecum (Complainants' Exhibit 1) and with reference to the relevancy and competency of the documents and papers described in Paragraphs 3 to 16, both inclusive, of said subpoena duces tecum, were offered and received in evidence as Complainants' Exhibits 110 and 111, respectively.

"Mr. R. T. Jackson: I would like also to say one other thing. Several days ago in what I regarded as a collateral matter arising out of the form of an exhibit that had been prepared by one of the company executives there was a reference, or there was included certain data with reference to rates and the court struck that data from the exhibit.

I stated at that time that we did not wish to make any point, or be heard because it was only collaterally mentioned, that there were certain aspects in which our opinion rates are material; that in those aspects the case could not be decided without some reference to rates.

That was not any question of the reasonableness or unreasonableness of the plaintiff's rates, but merely a question of showing what the rates of our competitor are, and something of a comparison or differential.

I had understood the Court to say—and then I asked whether when that did become material so we could present the question in the narrower aspect that it is involved in this case, we might have an opportunity to file a brief and be heard. We have prepared the brief, and intended to file it when and as that question arises.

Judge Allen: The Court will consider any authorities submitted on behalf of any ruling. But the Court has ruled upon this question and now adheres to it."

Counsel for complainants then had marked for identification as Complainants' Exhibit 109 the "Extract from Hearings Before the Sub-committee of the House Committee on Appropriations, Seventy-Third Congress, Second Session".

"Mr. S. D. L. Jackson: At this time Complainants offer in evidence from Exhibit No. 109 for identification the following, which appears on page 137.

Mr. Fitts: May it please the Court, I assume that the previous ruling to the effect that the defendants may have the opportunity to offer any other portions that are relevant will obtain.

Judge Gore: From the same documents.

Mr. Fitts: From the same document, yes.

Judge Allen: That is the ruling."

Counsel for complainants then offered and read in evidence from Complainants' Exhibit 109 for identification the following excerpts: On page 137 beginning with "The Chairman. We have an estimate" and concluding with the statement of Dr. Morgan ending "over a considerable range"; on pages 138 and 139 the whole section under the [fol. 162] heading "Reasons for Not Issuing Bonds to Finance Project"; on page 140 from the top of the page to the end of the section entitled "Power Which Can Be Developed at Muscle Shoals"; on page 143 the question of Mr. Oliver beginning "Let the doctor" and Dr. Morgan's reply thereto; on page 144 the question of Mr. Oliver beginning "What other items" and Dr. Morgan's reply thereto, and Mr. Oliver's question beginning "And all of that is very essential" and Dr. Morgan's reply thereto; on page 147 the entire section entitled "Value and Necessity for Building Four Dams"; on page 150 the first two questions and answers under the heading "Navigation Improvements"; on page 151 the first twelve lines under the heading "Number of Dams to be Constructed"; beginning on page 152 with Mr. Bacon's statement "Those six new dams you contemplate" and ending on page 153 with Dr. Morgan's statement "Possibly a million of secondary power"; on page 155 beginning immediately below the table and ending with the statement of Dr. Morgan "We are building the dams"; on page 156 beginning the third line from the top of the page to the heading in the middle of the page; on page 159 beginning with the statement of The Chairman: "Do you contem-

plate buying any hillsides" and ending with the statement of Dr. Morgan on Page 160 "No; not for reforestation alone"; on pages 162 and 163 the entire section under the heading "Purchase of Utilities from Private Companies"; on pages 165 and 166 beginning immediately under the heading "Total Cost of Project" and ending with the statement of Dr. Morgan "We do not know which road we can take"; on page 166 beginning with the statement of The Chairman: "What I am trying to get at is" and concluding with the statement of Dr. Morgan ending "we would have to come to the rescue"; on page 168 the statement of Dr. Morgan beginning "We have made no plans for roads"; on pages [fol. 163] 170 and 171 the entire section under the heading "Breakdown of expenditures for Fiscal Years 1934 and 1935"; on page 172 beginning with the statement of The Chairman: "You have a little organization down there" down to the heading "Basis for Fixing Salaries of Employees".

"Mr. Fly: If your Honor please, these statements cover so many specific subjects, I am not undertaking to object each time he branches off from one to the other. I believe it is inevitable in reading through here, he will touch upon a number of subjects which have been ruled out, and I assume, of course, that we will not waive our objections later, when they follow through with substantial testimony on those same points.

Judge Allen: The Court has already ruled on this subject, that the whole report will be received in evidence with permission to counsel for either to comment on such portions as they desire, but the whole report necessarily is considered in evidence. The Court considers it could take judicial notice of the whole report."

Counsel for complainants then offered and read in evidence from Complainants' Exhibit 109 for identification the following excerpts: On page 174 The Chairman's question "Do you contemplate the employment of salesmen" and Dr. Morgan's reply thereto closing with the words "with the use of electricity"; on page 179 beginning on line 9 with Mr. Bolton's statement "I mean the development" and closing with Dr. Morgan's answer "Yes, sir"; on page 179 the statement of Dr. Morgan beginning "With cheap power"; on page 181 the statement of Dr. Morgan, just above the sub-

head breaking the page and beginning "In the stretch of river"; on page 184 the two questions of Mr. Bolton and Dr. Morgan's replies thereto under the heading "Cost of Norris Dam and Value to Navigation; on page 185 the entire section under the heading "Cost of Aurora Dam", on page 187 the first two questions and answers under the [fol. 164] heading "Market for Power to be Developed"; the question at the bottom of page 187 under the heading "Size of Territory to be Served" and the answer thereto, and the first question and answer on page 188 under the heading "Distance Power can be Transmitted Economically"; beginning on page 192 under the heading "Revenues and Cost of Operation and Maintenance" and continuing through the statement of Dr. Morgan on page 194 ending "we should charge 2/3rds of it to power".

"Judge Allen: The Court thinks that the case will be in better sequence if counsel for the Authority was now permitted to offer whatever they care to from this particular report.

Mr. S. D. L. Jackson: Very well.

Mr. Fly: Of course it does take time to go over quotations and places that it is necessary to get further material to fill them out, and we are not prepared to follow instantaneously upon his reading from particular documents.

We are, however, prepared now, to do the reading on the document which complainants read from last week, and with the Court's permission we will complete that task at this time.

Mr. S. D. L. Jackson: If the Court please, if I might suggest, unless defendants want to follow immediately and read from the same book, and of course we have certain grounds of objection to their doing that that I would like to state and be heard on at the time, but why they should come in now and read from a book we read from last week, that does not help the orderly presentation of the case, it seems to me, and that should be withheld until the proper time, when they are putting in their case.

Mr. Fly: When the Court closed last week we had had no opportunity to read from this document, as your Honor will recall.

Of course we cannot undertake, after he reads from numerous pages throughout a lengthy document, we cannot undertake to go over the entire document at that time and

get everything to respond to it without a few hours' opportunity to examine it.

Mr. S. D. L. Jackson: Well, then, might I suggest they hold that until they reach their case?

Mr. Fly: No, we want to respond to your case as soon as we can.

[fol. 165] Judge Allen: The Court considers that the application of the Tennessee Valley Authority to be permitted now to read extracts from the report from which the complainants read extracts last week is reasonable, and that will be permitted before proceeding further.

Mr. Fly: Thank you.

Mr. S. D. L. Jackson: May we have an exception?

Mr. Fly: Mr. Marks, will you take that up?

Mr. S. D. L. Jackson: And may we point out, if your Honor please, that these portions offered by the defendants here can be nothing more than self-serving.

Complainants, I might say here, are offering, and these extracts have been received in evidence, and we consider that they are admissions against interest on the part of the defendants.

Judge Allen: The Court feels this is admissible in evidence, and it is also considered that the Court can take judicial notice of it. The Court will consider the entire report, and it is for the convenience of the Court that the parts relied upon by respective counsel for the litigants will be considered as nearly in sequence as possible. It is true that as the case closed on Friday the opportunity was not given to read these parts.

Mr. S. D. L. Jackson: That is correct.

Judge Allen: From the report of 1933.

Mr. S. D. L. Jackson: I appreciate that, and I do not want to be obstructive to a procedure which is for the Court's convenience. I merely want to point out that I do not think they have any right to rely upon admissions that they made to Congress which can be only self-serving from their own standpoint. I do not think it has any proper function in evidence.

Judge Allen: The ruling of the Court is the same. It adheres to its ruling upon the question of receiving the entire report in evidence.

Under that ruling counsel for the complainants are enabled to get into this record evidence which the court has indicated it considers irrelevant or immaterial in the application for subpoena duces tecum.

The Court will consider those parts of the report which counsel for the Authority wish to introduce at this time. You may have an exception.

Mr. S. D. L. Jackson: May we have an exception to the Court's ruling, and an exception in the event portions are read here which are not explanatory only of portions [fol. 165a] which were read by us from that document?

Judge Allen: You may have your exception, Mr. Jackson. The Court would remind counsel that they expect to have a specific objection and exception taken to every item to which counsel objects.

Mr. S. D. L. Jackson: Very well.

Judge Allen: The Court would remind counsel that the question of admissibility of these statements made to the Committee on Appropriations of Congress came up, and the Court ruled that it would not receive isolated portions of the report. It ruled that the entire report would be received in evidence, and it is our understanding that counsel for the complainants offered this entire report in evidence.

Mr. S. D. L. Jackson: If the Court please, what we did was to have the entire report marked as an exhibit for identification.

We offered in our case the portions of the report that we read to the Court. We were aware of the Court's ruling about it, and I think we saved an exception to it at the time, and said that what we wanted in our case was the portions which we selected, and which we read to the Court.

In order that there may be no misunderstanding—

Judge Allen: The Court ruled that it would not receive in evidence isolated portions of the report. And it ruled that it would receive the entire report.

This entire report, I understand, for the year 1933, was received in evidence by the Court. That was the ruling of the Court.

Mr. S. D. L. Jackson: If the Court please, it was not offered by us. I appreciate that if the Court can take judicial notice at this time,—and I believe it is a matter of which the Court can take judicial notice—

Judge Allen: The Court considers that you could not pick out a sentence out of a contract, and offer that sentence out of a contract which is before the Court in evidence without offering the contract.

[fol. 165b] The Court has received the entire report, and at this time the Court will hear counsel for the Authority bring out to the Court what portions of the report of 1933 he cares to comment upon.

Mr. S. D. L. Jackson: May we reserve our exception to the Court's ruling?

Mr. Fly: May it please the Court, as I recall our original objection was based upon the point that these extracts or excerpts were incomplete, and were therefore misleading. And I believe it was upon the basis of that that the Court thought it fair to permit the introduction of the entire document, and for each of the parties to direct the attention of the Court to so much of the document as they intended to rely upon.

Now, if there is any doubt as to the complainants' position, if they insist that these partial, incomplete extracts here shall go in, without the entire document being available to go in, I, at this time, move to strike out all of the excerpts which counsel have read from these documents.

[fol. 166] Judge Allen: The motion to strike is sustained. The court will not receive in evidence isolated or garbled portions of a document. The portions or statements made by Dr. Arthur E. Morgan, Chairman of the Tennessee Valley Authority to the Appropriations Sub-Committee of the House Committee on Appropriations, 73rd Congress heretofore read into the record will be stricken.

Mr. S. D. L. Jackson: May we have an exception?

Judge Allen: You may have an exception.

Mr. S. D. L. Jackson: Now, not waiving the benefit of our exception to your Honor's ruling, we offer in evidence the entire exhibit, which has been marked, I believe, exhibit 109. Is that correct, Mr. Hale?

Mr. Hale: Yes.

Mr. S. D. L. Jackson: The extract from hearings before Sub-Committee of House Committee on Appropriations for the year 1934, exhibit 109, and let the record show that we read in evidence from that exhibit, and now offer the portions that we read in evidence this morning and the whole document.

Judge Allen: The entire document will be received in evidence. The Court upon the application of complainants, the Court reiterates its ruling that isolated or garbled portions of the document will not be received in evidence under the ordinary rules of evidence.

.

Mr. Fly: I want to make my position clear, please. This is important. My suggestion was that it is inappropriate to offer this document in evidence as a part of the record of evidence in this cause, as if the Court had ruled that every portion of it were relevant or material to some of the issues.

Now, as I have suggested, we have no objection to the position which the Court has repeatedly announced, that is, this Court will take judicial notice of the entire document, and counsel at any time, in the course of their argument, in the course of their briefs, at any time, may draw the attention of the Court to any portion which they rely upon. But, I do object to their placing in proof of any portion of the document, having it received here as though adjudicated as relevant and material to some issue, and our basis for that is this, the Court can take judicial notice of the entire thing. Under those circumstances, it is improper to accept the document.

[fol. 167] Judge Martin: Don't you understand we merely permitted the reading of certain excerpts by either side. We are ruling the document might go in in its entirety or not at all. But, under the Court's ruling, we are permitting either side, the complainant or the defendant to read such portions as they may desire for our help. That does not mean they are offered in evidence, the whole document is in evidence. Nor, does the reception of the report in evidence mean we admit or hold all of its contents to be relevant to the case.

Mr. Fly: That is the point I wanted to save, your Honor, that is it is put in there for convenience to refer to and is not accepted, is the ultimate ruling of the Court, that any or all portions of it are not here determined to be material and relevant to the issues.

Judge Martin: We understand that.

Judge Allen: The specific ruling before upon this question was that it would be received for whatever weight it might have, whatever materiality and relevancy or competency it might have.

Mr. S. D. L. Jackson. If it please the Court, may I also offer at this time, without waiving the benefit of our exception to the Court's ruling the entire,—out of the exhibit No. 108 for identification we offer now the portion relating to the Tennessee Valley Authority beginning at page 23 and continuing over to page 36.

Mr. Fly: May I inquire of counsel—

Mr. S. D. L. Jackson: Just a moment, please, Mr. Fly,—which is the portion of the pamphlet that has been physically marked Complainants' Exhibit No. 108 that relates to the Tennessee Valley Authority; and may we, at the same time, have the record show that we specifically direct the Court's attention to those portions of that document that we read in evidence here last Friday?

.

Judge Allen: The entire statement will be received in evidence, and counsel for either litigant may call the attention of the Court to whatever portions either counsel may desire.

Mr. Fly: And the point as to materiality and relevancy is saved, your Honor?

Judge Allen: That is the ruling of the Court.

Mr. Fly: Thank you.

Mr. S. D. L. Jackson: Then may the part that was read [fol. 168] last Friday, which under the Court's ruling would be stricken, may that remain in the record, to show the portions of that exhibit to which we specifically direct the attention of the Court, and the same with Exhibit 109, which I offered a moment ago? I take it the other side has the same right.

Judge Allen: The Court will consider that the portions stricken out have been read to the Court and that the Court's attention has been called to those portions by counsel for the complainants. And they will be considered together with other portions of the statement."

Counsel for defendants then read the following excerpts from Complainants' Exhibit 108 (which excerpts are set forth in Appendix C following Defendants' Exhibits):

Beginning with the sentence at the bottom of page 23 "That dam will have one immediate result" and extending through the statement of Dr. Morgan on page 25 ending

"That will afford us a better degree of flood control"; and the first eleven lines on page 26 ending with Dr. Morgan's statement "Yes, sir".

Counsel for defendants then read from Complainants' Exhibit 109 the following excerpts (which excerpts are set forth in Appendix D following Defendants' Exhibits):

On page 162 the statement of Dr. Morgan beginning "You are speaking" and the Chairman's answer thereto; on page 179 the five lines beginning with the question of Mr. Bacon "Could you give us, for the record"; on page 179 beginning with the question of Mr. Bacon "You anticipate" extending through and including the table at the end of page 179 and the top of page 180; on page 180 the first four lines under the heading "Record of Floods on Tennessee River and Tributaries", and the next to the last sentence in the fine print immediately above the table at the bottom of the page; the last sentence in fine print at the top of page 181; on page 184 the first eight lines under the heading "Cost of Norris Dam and Value of Navigation", and the first eight lines under the heading "Cost of Hiwassee Dam"; the last two lines on page 185; and on page 186 the question of Mr. Taber "Is this a storage proposition" and Dr. Morgan's reply thereto.

[fol. 169] Thereupon counsel for complainants had marked for identification as Complainants' Exhibit 112 "Extract from Hearings Before the Sub-Committee of the Committee on Appropriations, United States Senate 73rd Congress, Second Session".

"Mr. S. D. L. Jackson: I might say the extract which has been marked does not contain all of the material that is in that pamphlet, but begins on page 261 of that pamphlet, and at this time we desire to move to be permitted to offer in evidence certain extracts. May I have an exception?

Judge Allen: That will not be received. Under the rulings of the Court isolated and garbled extracts of a document will not be received in evidence by the Court. You may have your exception.

Mr. S. D. L. Jackson: May I have an exception, and then without waiving the benefit of the exception to the Court's ruling, I offer in evidence Complainants' Exhibit No. 112.

Mr. Fly: I understand you are offering the entire document in evidence.

Mr. S. D. L. Jackson: I desire to specifically call the attention of the Court to certain extracts from this document.

Mr. Fly: I assume, of course, the limitations as to the substance of future documents will be applied.

Judge Allen: The document will be received in evidence, and counsel may read such portions as they desire.

Mr. Fly: And again, your Honor, without any ruling on the ultimate materiality or relevancy.

Judge Allen: Ruling the same way."

Counsel for complainants then directed the attention of the Court to the following excerpts from Complainants' Exhibit 112 which had been excluded when offered as excerpts: beginning with the last question of Senator Dickinson on page 262 and extending through Dr. Morgan's answer of "Yes" to Senator Dickinson's question "As a radius" on page 263; on page 265 the first question of Senator Dickinson and Dr. Morgan's reply thereto; beginning on page 266 with Senator Dickinson's question "Well, now, when you extend your sale" extending to the end of page 267; the [fol. 170] last eleven lines on page 269; on page 270 the question of Senator Dickinson "Well in your testimony" and Dr. Morgan's reply thereto; at the bottom of page 270 the question of Senator Hale beginning "But you might at any time" and Dr. Morgan's reply thereto; the statement of Dr. Morgan beginning at the bottom of page 275 and concluding at the top of page 276; beginning with the statement of Senator McKellar on page 280 "Well while we are waiting" and extending through the statement of Dr. Morgan on page 281 ending "and make them into one unit"; and on page 287 the question of Senator Dickinson beginning "And, if it takes \$300,000,000" and Dr. Morgan's reply thereto.

Counsel for complainants then had marked for identification as Complainants' Exhibit No. 113 the Annual Report of the Tennessee Valley Authority and Appendixes for the Fiscal Year Ending June 30, 1934.

"**Mr. S. D. L. Jackson:** I have had it marked for identification.

And from exhibit 113 for identification Complainants offer in evidence the power policy appearing on pages 22, 23 and the first four lines of page 24, the announcement as to rates appearing in the last two sentences of paragraph beginning at the top of page 34, the wholesale power rate sched-

ule, and the standard residential resale rates on pages 35 and 36, and the three paragraphs on page 56 under the heading 'Information'.

Judge Allen: All of these extracts are ruled out under the previous ruling.

Mr. S. D. L. Jackson: May we have an exception to the ruling on each of these extracts separately?

We now offer, without waiving the benefit of our exception, we now offer the entire exhibit in evidence.

Judge Allen: It may be received.

Mr. Fly: And the same ruling as to materiality and relevancy, your Honor?

Judge Allen: It may be received under the same ruling."

Counsel for complainants thereupon called the court's attention to the excerpts from Complainants' Exhibit 113 which [fol. 171] had been excluded when offered as excerpts.

"Mr. Fly: May it please the Court, in view of the volume of this material I should like to suggest that we not build up the record or the evidence here. These documents are all matters of judicial notice and I suggest that Counsel read them to the Court off the record and later he can rely upon those passages or any other passages that may be pertinent.

The usual procedure, I believe, with documents of this character simply is to draw them to the attention of the Court, and off the record later they can be argued for what they are worth, and as to any portions of them.

Judge Allen: The Court suggests to counsel that it might be possible to introduce these documents in evidence and to make abstracts of copies of the excerpts which counsel on both sides desire to have the Court note particularly, and hand them in to the Court.

In other words, it looks to the Court as though quite a good deal of time were going to be expended in reading things which we can read twice or three times as quickly with our eye as we can hear them with our ears.

.

Mr. R. T. Jackson: Our view of the question, that is our understanding of it, which is somewhat different, and the Court understands we would like to preserve our understanding on that position,—I don't understand that these matters are necessarily, on questions of motions to plead-

ings,—the Court will sometimes take judicial notice. The question, however, of taking judicial notice of a fact, and the question of whether they take judicial notice of something, or whether something is admissible in evidence, is quite different. If the Court takes judicial notice of the navigability of a river, then that settles it. No evidence could be received one way or the other, the Court says that is a known fact that must control the litigation.

On the other hand there is a great deal of evidence of the character of official reports which, if relevant, may be received by courts. And yet it is not irrebuttable. Other evidence may be offered to rebut the facts or the inferences of fact that would be drawn from those reports.

Now, I don't understand the particular, or proper practice to be that the Court takes judicial notice of those things, so that the litigants complete a trial without knowing whether the Court has got before it these documents, and whether the Court is going to treat them as susceptible of inference of fact; because if so, the litigant might wish to rebut it.

[fol. 172] Now, I don't think that creates any problem here for us, but I do think we have a right to present the excerpts that we think are relevant and material, and while the Court rules that they take judicial notice of these documents, and we necessarily accept that rule here, we think we are entitled to preserve our position and be able to offer such evidence as we think is necessary or pertinent.

Judge Allen: The Court has made two rulings. The Court ruled, not understanding that you were objecting to the document being received upon the ground that we could take judicial notice of it, the Court ruled that we would take judicial notice of it. Then when this controversy arose today the Court ruled that it would not receive isolated portions of such documents. You now have been introducing in evidence the whole document.

Mr. R. T. Jackson: And preserving our record, as I understand it.

Judge Allen: And preserving your record.

Mr. R. T. Jackson: And that is the way we would like to continue to do it, without taking the time of this Court. I think that by marking it and letting them be copied into the record we would do it expeditiously.

Mr. Fly: May it please the Court, I must say one thing, Mr. Jackson has pointed out the reason why the Government is gravely anxious about this matter.

He has just said he wants to know now, as we go along, the facts that are in this record, from which inferences may be drawn, and findings based. And that is the very confusion that is going to arise at the end of this line of so-called testimony.

In fact, when we come to make the findings of fact, the very fact he is willing to state here now, and say he is offering those as evidence, and he is going to rely upon it as evidence, he is going to assume he can draw an inference from it is a warning he is going to assert later that this court has already ruled upon the materiality and relevancy of everything that has been copied down into those notes.

Now, that is a grave anxiety that I have expressed, that by sitting here and having them read in everything on rates, E. H. & F. A., and cost allocations, and whatnot, that is the reason I was so anxious to have the Court understand our position, and to repeatedly get the assurance that the materiality and relevancy were not ruled upon at this time.

Mr. R. T. Jackson: I assume that the situation often occurs in Equity cases, the Court takes certain evidence which it may later say it has concluded on full examination of the case is irrelevant, or something else, and exclude it.

[fol. 173] What we are trying to do, in short, is to get a convenient way that won't take the time of this court to put those excerpts into the record so that the Court will have them and that we, as counsel, will have them, who have not access to those books.

Judge Allen: The Court has heretofore ruled, and adheres to its ruling that in accepting these reports it is not ruling on the competency and materiality or relevancy of evidence. The Court feels that attorneys for the complainants are entitled as a matter of right to make their records. We should like the cooperation of counsel in relieving us of hearing the things that we can read so much faster.

Speaking for myself, I can read about four times as fast as it can be read to me, and I am sure that the other Judges can read faster than that.

It will be a great saving of time if these excerpts can be presented to us without being read to us.

But it must be understood that in each instance where the record shows that extracts have been offered singly, isolated, without the whole document being offered, that

the Court adheres to its ruling. The Court will not receive in evidence any isolated portions of any documents.

Mr. R. T. Jackson: We understand that perfectly, and we are not in any way trying to avoid that ruling.

And, if I may suggest, what we would like to do is this, let the record be made by simply offering the excerpts and having the objection sustained and an exception noted. Then let the whole document be offered, and then let the record show that we indicate that we direct the Court's attention to the following excerpts, and we will mark them on the margin and submit them to the other side, and the reporter can put them in the record.

We would like to have it also understood for purposes of offering the proof, those excerpts are the same excerpts which we have offered from documents, had the Court permitted us to proceed in that way.

Judge Allen: The Court feels it would be an aid to the court if this method were followed in the presentation of the extracts from the reports.

Judge Allen: The Court suggests that counsel, if they desire, could hand us copies marked indicating clearly what points are stressed. We will be very careful to read each page.

[fol. 174] Mr. R. T. Jackson: May I suggest that we will, if the Court prefers we do that, that the copies that we supply the Court, we will mark for instance with red pencil in the margin the parts that we will have tendered in the original to the reporter, and let him have that to copy his excerpts from, and then counsel for the defendants may mark with blue pencil in the margin additional excerpts to which they wish to direct the Court's attention and then we will turn them over after we have made our mark.

Judge Martin: It would save stenographic service too, and time of the counsel and the Court, to do that. If you will just mark them, and identify them, as you say in red and blue, that is the easiest way.

Mr. R. T. Jackson: But we will still have the reporter copy them in showing which is which in the record."

[fol. 175] Counsel for complainants then had marked for identification as Complainants' Exhibit 114 the Hearing Before the Sub-Committee of the House Committee on Appropriations in Charge of Deficiency Appropriations, 74th

Alabama, and later on Gulf Power Company, Florida. In March, 1928, I became manager of sales of Alabama Power Company. In 1930, I was elected Vice President of the Company.

In my capacity as Vice President, in charge of industrial operations, I am familiar with the development of the Company's business, in connection with its industrial operations. [fol. 186] During 1912, the Company was constructing a hydro-electric generating plant on the Coosa River at a site known as Lock 12, but now known as Lay Dam, and had acquired there water power sites for future development. The larger cities and industrial centers of the state were the logical markets for the power we developed. The utility companies serving the larger cities had their own electric generating plants, which for the most part were operated by steam, and the industries were driven by steam engine units, as a source of mechanical power.

Electric meters had not at that time become in general use in our territory, so that it was necessary in our work to convert mechanical power demand into electric power demand. A wholesale power division of the Company was formed, comprised of some of the best engineering talent available, which made studies of the power requirements of the existing industries. They conducted plant tests, to determine the demands for power, its use and its cost, the possibilities of further mechanization, the capital cost of electrification, and other economies which may result from the purchase of power from our system. These studies clearly showed the general economic needs for purchased power by the industrial groups, and reports describing these economies were prepared, submitted and discussed with the various industrial consumers. By the end of 1914, the Company had signed contracts for a total of 28,500 kilowatts of power. Of this amount, however, only about $\frac{1}{3}$ was with industrial customers, the remaining part being with utility companies.

The first major group of industries to contract for electric power were the coal and ore mines. Many of these mines found it to their advantage to substitute electric power for the work done by steam engines, mules and men, and electricity was substituted for oil in mines where dangerous gases were present. The next major group of industries was the textiles. At first the mills were hard to convince [fol. 187] of the economies of electric power, for they had

efficient power plants and low production costs. However, as these contracts were signed and experience was had with purchased power, the mills found that their production increased by reason of the fact that power from a large stable system like ours made for consistent speeds and the quality of finished goods was improved. These experiences and the continued program of education and extension of our power lines, which was carried on at the same time, resulted in additional power business. By the end of 1920, the Company had contracted for the delivery of 104,000 kilowatts of power to the larger cities and to industrial areas of central and northern Alabama. Some of these cities were, Birmingham, Montgomery, Anniston, Huntsville, Gadsden, Decatur, Jasper, Talladega, Tuscaloosa, Sylacauga, Selma, Opelika, and other smaller communities.

Having power available to the principal centers of population where there was an existing labor market, the Company commenced to collect factual data pertaining to the natural resources of the state, with the idea of attracting new industries to these larger centers. The facts developed in these studies pertained to the labor market, climatic advantages, fuel supply, water supply power at reasonable rates, and other pertinent data. This information was used later in advertising and exhibits for the purpose of interesting new industries in our state.

In 1922, the Company decided on a broad policy of fostering industrial development, to present the natural resources in the state. Regular advertisements were carried in a number of the leading trade journals. Space was rented at the Textile Show at Boston, the Chemical and Power Show at New York City, and the Chemical and Arts Exhibit at Philadelphia. At one of these exhibits 50,000 cotton bolls were given away as souvenirs.

[fol. 188] The Alabama Power Company maintained an organization for the development of new industries in the state. In 1925, the new industries division of the Company was supplemented with a competent personnel. We began actively calling upon industrial customers in the north central and northern cities. Proposed sites for power plants were requested by these people, and pertinent information was given to them. The work was carried on successively through the years, in cooperation with state agencies, and at present it requires directly four employees in this work.

"Judge Allen: The Court feels that testimony along this line from other witnesses with reference to other companies does not need to be gone into in this manner."

.

"Judge Allen: The Court will permit you to develop this case as a typical case. The Court will permit you to develop this case."

The map (offered and received in evidence as Complainants' Exhibit 182) shows the State of Alabama with our major generating plants and transmission lines thereon; and also shows by black dots the location of 204 new industrial customers which have located in the State of Alabama, since 1925. These industries were located in cooperation with civic and other bodies in 81 cities of forty-five counties of the state. Approximately 30,000 employees are represented by these 204 industries. An analysis of the 1936 revenue of the Company indicates that more than 25 per cent of it came from these new industries. The approximate investment in these various plants is \$74,000,000.

Throughout the years the Company has maintained a staff of power sales engineers. Today there are eleven such men in our employ. These men advise with our industrial customers with regard to the proper application of power to their business, and are familiar with each department of power uses. They assist in making wiring layouts, in making reports as to the economies of further electrification or mechanization of the plants, and generally assist the customers in the economical use of the service in every way that they can, to the end that the customer may enjoy the maximum benefits of our service at the lowest rates.

As early as 1915, the Company launched activities to develop its residential business by conducting wiring campaigns to induce customers to wire their homes for electricity. Solicitors were employed for the purpose and in many cases the wiring was financed on time-payments by the customer. Campaigns were carried on to improve the type of electric fixtures and to improve lighting in the home. At that time the electrical appliances available were few, such as electric irons and fans. Selling campaigns were conducted on these, and when other minor appliances

were developed, the Company later organized crews and made door to door canvasses with a truck to present these appliances to our customers. Later on, as major appliances were developed, such as refrigerators, electric ranges and electric water heaters, the Company aggressively and actively took up the sale of those appliances. The Company maintains a staff of 23 home lighting people, who do not sell any equipment whatever. They make door to door canvasses of residential customers and explain the benefits which accrue from improved illumination in the home. During last year these representatives made over 40,000 calls on our residence customers.

The chart (offered and received in evidence as Complainants' Exhibit 183) shows by years the gross appliance sales volume of the Alabama Power Company for the ten year period, beginning with the year 1927 and ending with the year 1936. The appliance sales organization of the Alabama Power Company is comprised of 94 employees. In addition to these employees, there are more than 500 employees in the accounting, operating and other departments of the Company who sell appliances on their own time, and who [fol. 190] ordinarily contribute by their sales about 50 per cent of the total gross volume sold by the Company.

In addition to these direct sales by its own employees, the Company since 1923 has cooperated with the independent dealers who sell electric appliances, and for many years these independent dealers have sold the greater part of the refrigeration volume in our state. In 1933, the Company adopted a new scheme of dealer cooperation, particularly with regard to the sale of electric ranges and electric water heaters. This cooperation consists of doing for the dealer on his sales of major appliances the same thing that the Company does for its customers who purchase appliances; viz., we furnish interior wiring, home economists' services to see that the appliances are properly administered, and cooperate generally with these dealers. We have contracts with more than 225 dealers and we have seven dealer representatives employed directly by the Company, who help the dealers with their sales.

The Company constructed its first rural lines in 1920. By the end of 1923, the Company had constructed fourteen rural lines aggregating thirty-nine miles, and selling 240 customers. At this time the Company's transmission lines

Congress, First Session. From that exhibit for identification counsel for complainants offered in evidence the following excerpts: on page 484 the first six lines, and the eleven lines beginning with the statement of the Chairman "I am speaking now of stopping"; on page 525 beginning immediately under the heading "Possibilities of Transmission of Electric Current" and ending with the statement of Dr. Morgan "You could by that kind of substitution get clear up to Cleveland or Detroit"; beginning with the question at the bottom of page 534 "What are you going to do" and ending on page 535 with the statement of Mr. Lilienthal "to the site of Gunter'sville Dam and Chickamauga Dam."; the sentence of Mr. Lilienthal on page 535 beginning "The other large item"; the complete statement of Mr. Lilienthal beginning at the top of page 536; on page 538 beginning with the heading "Rural Lines for Temporary Operation in Alabama, Mississippi, and Tennessee" and ending with the statement of Mr. Lilienthal "The Authority does own some rural lines; yes, sir."; on page 596 the first five lines under the heading "Amount of Horsepower to be Developed by Norris, Wilson and Wheeler Dams by 1937"; on pages 615 and 616 the entire section under the heading "Power Development, Norris Dam"; on page 617 the entire section under the heading "Power Development, Wheeler Dam"; on page 635 beginning with the heading "New Dams to be Started in 1936" and ending with the statement of Dr. Morgan "That is my judgment, but possibly two."

"Judge Allen: All of these excerpts will be rejected upon the grounds previously stated.

Mr. S. D. L. Jackson: May we have an exception to the ruling, relating to each separate excerpt that is rejected. [fol. 176] Without waiving our exception to the Court's ruling we now offer Complainants' Exhibit No. 114 and specifically direct the Court's attention to the excerpts that I have enumerated and ask that we be permitted to mark those in red pencil in the exhibit, and that the excerpts so marked in red pencil are the same excerpts as I have formerly separately offered, and which have been rejected, and to which we have saved an exception.

Judge Allen: Exhibit 114 will be received in evidence with that understanding.

Mr. Fly: May it please the Court—

Mr. S. D. L. Jackson: Just a moment, Mr. Fly. And may I ask that those excerpts as so marked be then copied in the record at this point, by the reporter.

Judge Allen: Yes.

.

Mr. S. D. L. Jackson: My attention has been called to the fact, if your Honor please, I neglected to mention a table on page 605, which I would like to have treated along with the other excerpts as being first separately offered, refused, and exception, and then offered as a part of exhibit 114, under the same reservations, and in the same manner as the other excerpts that I mentioned.

Judge Allen: That may be done.

Mr. S. D. L. Jackson: And copied into the record."

The excerpts referred to by counsel for complainants from Complainants' Exhibit 114 were thereupon placed in the record.

Counsel for complainants then had marked for identification as Complainants' Exhibit No. 115 the Hearings Before the Sub-Committee of the House Committee on Appropriations in Charge of Deficiency Appropriations, 74th Congress, Second Session. From this exhibit for identification counsel for complainants offered in evidence each of the following excerpts separately: beginning with the heading on page 113 "Estimate Requested for 1937" and extending to the end of the fine print on page 114; beginning on page 114 immediately under the heading "Additional Dams Required to Complete Channel for Knoxville to the Mouth of Tennessee River" and ending with the statement of Dr. Morgan on page 115 "It just represents the length of time"; beginning with the statement of the Chairman on page 121 "Take the dams" and extending through the first two lines on page 122; the table on page 123; on page 275 beginning under the heading "Rural Line Construction" and ending with the statement of Mr. Lilienthal "where there is already an agency on the ground"; the table on page 279; on page 284 beginning with the statement of Mr. Lilienthal "Yes, sir. That is on Schedule I" and extending to the end of the fine print near the bottom of the page; and on page 285 the question of Mr. Taylor beginning "What do you mean by this" and the answer of Mr. Lilienthal thereto.

"Judge Allen: Each excerpt listed is rejected upon the grounds previously stated.

Mr. S. D. L. Jackson: May I have an exception, a separate exception respecting each excerpt, and without waiving the benefit of our exception, we now offer in evidence Complainants' Exhibit 115 and specifically request that we be permitted to direct the Court's attention to each of the excerpts that I have previously mentioned, each of which are marked in red pencil, and I would like the record to show that they are the same excerpts, as were separately offered by the complainants before the Court's ruling?

And I also ask that each of them be physically copied into the record at this point.

Mr. Fly: I understand that this is all subject to the same limitations.

Judge Allen: Subject to the same ruling, Exhibit No. 115 is received."

The excerpts referred to by counsel for complainants from Complainants' Exhibit 115 were thereupon placed in the record.

Counsel for Complainants then had marked for identification as Complainants' Exhibit 116 the Hearings Before the Sub-Committee of the House Committee on Appropriations, 75th Congress, First Session. From this Exhibit 116 for identification counsel for complainants offered in evidence each of the following excerpts separately: the table on page 403; on page 407 the first question and answer under the heading "Purchase of Generator Equipment"; the table at the bottom of page 452; the "Justification of Estimates" on page 453 down to the subhead "General Equipment and Inventories"; on pages 454 and 455 the entire section under the heading "Transmission Lines and Substations"; on page 460 the six lines under the heading "Power from Wilson, Norris, and Wheeler Dams"; the table on pages 464 and 465; the table on pages 466 and 467; the table at the bottom of page 469; on page 470 the table and the text in fine print under the table; the tables and the explanation thereof beginning under the heading "Present and Proposed Transmission System Investment and Revenues" on page 478 and extending to the end of the fine print at the top of page 485; on page 485 beginning immediately under the heading "Investment in

Distribution Properties—Loans to Rural Cooperatives, etc.” and extending through the statement of Mr. Lilienthal, “it is very awkward to have two sets of loans and very expensive”; the first five lines on page 488; the table on page 488 and the explanation thereof beginning with “2. Electricity Operations,” on page 490 and extending to the end of that page; the “Memorandum on Firm and Secondary Power Rate Schedule C-1” appearing in fine print on pages 510 and 511; on page 513 beginning immediately under the heading “Available Electric Service in Areas Served by TVA” and extending through the note in fine print by Mr. Lilienthal; and on page 515 the graph entitled “Tennessee Valley Authority System Demand—Generator Installations—Firm Power Capacity”.

“Mr. S. D. L. Jackson: We make the offer as to each separately.

Judge Allen: Each and all of these excerpts will be rejected upon the grounds previously stated by the Court.

[fol. 179] Mr. S. D. L. Jackson: May I have an exception to the Court’s ruling with respect to each separate excerpt, and that without waiving the benefit of such exception we offer in evidence complainants’ exhibit No. 116, and request the right to specifically direct the Court’s attention to the particular excerpts formerly offered in evidence, and will mark such excerpts and each of them in the exhibit, and ask that the reporter physically copy them into the record at this point.

Judge Allen: The exhibit No. 116 may be received. It will be marked in red as the others.

Mr. S. D. L. Jackson: That is true, your Honor, we will mark each of the excerpts in red.

Mr. Fly. With the usual limitation, your Honor.

Judge Allen: Yes.”

The excerpts referred to by counsel for complainants from Complainants’ Exhibit 116 were thereupon placed in the record.

Counsel for complainants then offered in evidence and the court received as Complainants’ Exhibit 117 Appendix E of the Annual Report of TVA for the fiscal year ending June 30, 1935 which sets forth the power contracts between TVA and the City of Tupelo, Mississippi, dated November 13, 1933, the Town of Pulaski, Tennessee, dated March 8,

1934, the City of Amory, Mississippi, dated March 9, 1934, the City of Athens, Alabama, dated April 6, 1934, the Alcorn County Electric Power Association, dated June 1, 1934, the City of Dayton, Tennessee, dated September 12, 1934, the City of New Albany, Mississippi, dated September 13, 1934, the City of Muscle Shoals, Alabama, dated January 19, 1935, the Pontotoc County Electric Power Association, dated February 15, 1935, the City of Okolona, Mississippi, dated April 23, 1935 and the Prentiss County Electric Power Association, dated June 13, 1935.

Counsel for complainants then offered in evidence and the court received as Complainants' Exhibit 118 Appendix [fol. 180] A of the Annual Report of TVA for the fiscal year ending June 30, 1936 which sets forth the power contracts entered into between TVA and the Town of Bolivar, Tennessee, dated December 31 1935, the Town of Dickson, Tennessee, dated October 23, 1935, the City of Holly Springs, Mississippi, dated November 12, 1935, the City of Jackson, Tennessee, dated October 16, 1935, the City of Knoxville, Tennessee, dated February 19, 1936, and the Amendment thereto dated May 18, 1936, the City of Memphis, Tennessee, dated November 23, 1935, the Meigs County Electric Membership Corporation, dated October 14, 1935, the City of Milan, Tennessee, dated December 31, 1935, the Monroe County Electric Power Association, dated July 19, 1935, the Monsanto Chemical Company, dated May 15, 1936, and the Amendments thereto dated May 16, 1936 and June 2, 1936, the North Georgia Electric Membership Corporation, dated June 15, 1936, the Pontotoc County Electric Power Association, dated February 12, 1936, the City of Sheffield, Alabama, dated March 16, 1936, the Town of Somerville, Tennessee, dated December 31, 1935, the Tishomingo County Electric Power Association, dated July 19, 1935 and the Tombigbee Electric Power Association, dated October 19, 1935.

Counsel for complainants then offered in evidence and the court received the following documentary exhibits:

Complainants' Exhibit 119, being a power contract between TVA and the City of Amory, Mississippi, dated October 15, 1936.

Complainants' Exhibit 120, being a power contract between TVA and the City of New Albany, Mississippi, dated March 1, 1937.

Complainants' Exhibit 121, being a supplemental contract between TVA and the City of Okolona, Mississippi, dated March 24, 1937.

Complainants' Exhibit 122, being a supplemental contract between TVA and the City of Holly Springs, Mississippi, dated February 2, 1937.

Complainants' Exhibit 123, being a power contract between TVA and the City of Florence, Alabama, dated July 6, 1936.

[fol. 181] Complainants' Exhibit 124, being a power contract between TVA and the City of Tuscumbia, Alabama, dated March 8, 1937.

Complainants' Exhibit 125, being a power contract between TVA and the City of Knoxville, Tennessee, dated March 1, 1934.

Complainants' Exhibit 126, being a power contract between TVA and the City of Russellville, Alabama, dated March 13, 1934.

Complainants' Exhibit 127, being a power contract between TVA and the City of Decatur, Alabama, dated March 14, 1934.

Complainants' Exhibit 128, being a power contract between TVA and the City of Guntersville, Alabama, dated May 21, 1937.

Complainants' Exhibit 129, being a power contract between TVA and the City of Chattanooga, Tennessee, dated June 17, 1937.

Complainants' Exhibit 130, being a power contract between TVA and the City of Middlesborough, Kentucky, dated July 29, 1937.

Complainants' Exhibit 131, being an amendatory contract between TVA and the City of Middlesborough, Kentucky, dated October 20, 1937.

Complainants' Exhibit 132, being a power contract between TVA and the City of Trenton, Tennessee, dated August 23, 1937.

Complainants' Exhibit 133, being a power contract between TVA and the City of Jackson, Tennessee, dated September 1, 1937.

Complainants' Exhibit 134, being a power contract between TVA and the City of Paris, Tennessee, dated November 2, 1937.

Complainants' Exhibit 135, being a power contract between TVA and Prentiss County Electric Power Association, dated December 1, 1936.

Complainants' Exhibit 136, being a power contract between TVA and Cullman County Electric Membership Corporation, dated August 4, 1936.

Complainants' Exhibit 137, being a power contract between TVA and the Gibson County Electric Membership Corporation, dated August 13, 1936.

Complainants' Exhibit 138, being a power contract between TVA and The Middle Tennessee Electric Membership Corporation, dated August 13, 1936.

Complainants' Exhibit 139, being a power contract between TVA and the Pickwick Electric Membership Corporation, dated August 26, 1936.

[fol. 182] Complainants' Exhibit 140, being a power contract between TVA and the Duck River Electric Membership Corporation, dated October 31, 1936.

Complainants' Exhibit 141, being a power contract between TVA and the Southwest Tennessee Electric Membership Corporation, dated December 9, 1936.

Complainants' Exhibit 142, being a power contract between TVA and Joe Wheeler Electric Membership Corporation, dated September 24, 1937.

Complainants' Exhibit 143, being a power contract between TVA and the Cherokee County Electric Membership Corporation, dated November 2, 1937.

Complainants' Exhibit 144, being a power contract between TVA and the Northeast Mississippi Electric Power Association, dated March 26, 1937.

Complainants' Exhibit 145, being a supplemental power contract between TVA and the Northeast Mississippi Electric Power Association, dated July 27, 1937.

Complainants' Exhibit 146, being a power contract between TVA and the Alabama Asphaltic Limestone Company, dated May 1, 1936.

Complainants' Exhibit 147, being a power contract between TVA and the Goodyear Decatur Mills, dated May 1, 1937.

Complainants' Exhibit 148, being a power contract between TVA and the L. & N. Railroad Company, dated June 22, 1936.

Complainants' Exhibit 149, being a power contract between TVA and Rockwood Alabama Stone Company, dated August 25, 1936.

Complainants' Exhibit 150, being a power contract between TVA and Robbins Tire and Rubber Company, dated November 1, 1936.

Complainants' Exhibit 151, being a power contract between TVA and the Aluminum Company of America, dated July 20, 1937.

Complainants' Exhibit 152, being an amendatory contract between TVA and the Aluminum Company of America, dated July 20, 1937.

Complainants' Exhibit 153, being a power contract between TVA and American Aggregates Corporation, dated March 29, 1937.

Complainants' Exhibit 154, being a power contract between TVA and Falkville Milling Company, dated April 1, 1937.

Complainants' Exhibit 155, being a power contract between TVA and Wade & Rickey, dated May 1, 1937.

[fol. 183] Complainants' Exhibit 156, being a power contract between TVA and Lacey Asphaltic Limestone Company, dated May 13, 1937.

Complainants' Exhibit 157, being a power contract between TVA and Volunteer Portland Cement Company, dated August 14, 1936.

Complainants' Exhibit 158, being the assignment to the City of Knoxville, dated September 14, 1937 of the power contract between TVA and Volunteer Portland Cement Company.

Complainants' Exhibit 159, being a power contract between TVA and the United States of America concerning Sardis Dam dated May 14, 1937.

Complainants' Exhibit 160, being a power contract between TVA and Victor Chemical Works, dated July 2, 1937.

Complainants' Exhibit 161, being a power contract between TVA and Electro Metallurgical Co., dated August 17, 1937.

Complainants' Exhibit 162, being a construction contract between TVA and Meigs County Electric Membership Corporation, dated June 29, 1936.

Complainants' Exhibit 163, being a construction contract between TVA and Cullman County Electric Membership Corporation, dated August 4, 1936.

Complainants' Exhibit 164, being a construction contract between TVA and Cullman County Electric Membership Corporation, dated September 19, 1936.

Complainants' Exhibit 165, being an amendment dated February 27, 1937 to the construction contract between TVA and Cullman County Electric Membership Corporation.

Complainants' Exhibit 166, being a construction contract between TVA and the North Georgia Electric Membership Corporation, dated September 4, 1936.

Complainants' Exhibit 167, being a construction contract between TVA and The Middle Tennessee Electric Membership Corporation, dated September 15, 1936.

Complainants' Exhibit 168, being a construction contract between TVA and Southwest Tennessee Electric Membership Corporation, dated December 9, 1936.

Complainants' Exhibit 169, being a construction contract between TVA and the Gibson County Electric Membership Corporation, dated March 30, 1937.

Complainants' Exhibit 170, being a contract for the sale and construction of rural lines between TVA and Joe Wheeler Electric Membership Corporation, dated May 14, 1937.

[fol. 184] Complainants' Exhibit 170-A, being a supplemental contract between TVA and Joe Wheeler Electric Membership Corporation, dated September 24, 1937.

Complainants' Exhibit 171, being a construction contract between TVA and the Monroe County Electric Power Association, dated July 7, 1937.

Complainants' Exhibit 172, being a construction contract between TVA and the Duck River Electric Membership Corporation, dated June 15, 1937.

Complainants' Exhibit 173, being a construction contract between TVA and the Town of Pulaski, Tennessee, dated August 23, 1935.

Complainants' Exhibit 174, being a construction contract between TVA and the City of Dayton, Tennessee, dated January 24, 1936.

Complainants' Exhibit 175, being a construction contract between TVA and the Town of Bolivar, Tennessee, dated September 7, 1937.

Complainants' Exhibit 176, being a contract between TVA and Lincoln County Electric Membership Corporation for the collection of bills and other services, dated October 1, 1935.

Complainants' Exhibit 177, being a contract between TVA and Lincoln County Electric Membership Corporation for the collection of bills and other services.

Complainants' Exhibit 178, being a contract between TVA and Monroe County Electric Power Association for the operation of rural transmission line and collection of bills dated February 1, 1936.

Complainants' Exhibit 179, being an operation contract between TVA and Pickwick Electric Membership Corporation, dated April 21, 1936.

Complainants' Exhibit 180, being an operation contract between TVA and Bedford County Electric Membership Corporation.

Complainants' Exhibit 181, being an agreement for sale and loan between TVA and Gibson County Electric Membership Corporation, dated August 13, 1936.

[fol. 185] WELLS M. STANLEY was called as a witness on behalf of the complainants and, having been first duly sworn, was examined and testified as follows:

Direct examination:

I am 47 years old and reside in Birmingham, Alabama. I am Vice President in charge of sales of the commercial activities for the Alabama Power Company. I am a high school graduate, but not a college graduate. I was first employed with the electric and railway utility at Huntsville, Alabama, in July, 1909. In December, 1912, I became superintendent for the Etowah Light & Power Company at Attalla, Alabama, which had a small hydro-electric plant on Big Wills Creek, a steam plant for the pumping of the water supply and an electric and water distribution system. In September, 1914, I became local manager of the Alabama Power Company at Huntsville, Alabama. During the World War, I spent two years with the Alabama Power Company in Birmingham, as manager of its local operations, consisting of the railway, gas utility and water properties in the local communities where it operated. In December, 1919, I became division manager for Alabama Power Company at Huntsville, in charge of the Company's Northern Alabama operations. Early in 1925, I was appointed general manager of the Gulf Electric Company,

had been extended to the major load centers of the state, and it then gave consideration to the possibility of extending its lines to some of the rural communities and intermediate areas. About this time some of the major appliances were being developed and it appeared that these appliances, by their use, would tend to increase the sales of electric energy in these areas, and perhaps add to the attractiveness of this business. In 1924, the Company began an extensive program of educational work in the rural communities and among farmers. With respect to rural electrification it enlisted the cooperation of the State [fol. 191] Agricultural Experiment Station, the Alabama Polytechnic Institute, at Auburn, the National Committee on Relation of Electricity to Agriculture, and the Farm Bureau Federation. These agencies assisted in planning projects which the Company built as experimental lines, and committees of farmers assisted us in the development of these studies. One of the most important elements involved in rural electrification is to explain to the farmer how he can make electric service pay its way on the farm.

Some of the more important uses for electricity which were developed in our experiments have been the use of lighting in insect control, and to increase egg production, the use of power for dairy refrigeration, soil heating, potato curing, and miscellaneous other uses. During 1929 the Company, at its expense, made an installation in the Montgomery area of a hay drying outfit, with the idea of stimulating greater hay production, for the effect it would have on the production of live stock and its economic effect in the general area. The experimental and educational work conducted by the Company with these cooperating agencies heretofore mentioned resulted in a better understanding of the use of electricity on the farm, so that by the end of 1936 the Company had carried on an ambitious and extensive program of rural line construction. At that time it had in service a total of 3,561 miles of rural lines, serving 15,600 customers. In connection with this work, we employ 17 agricultural engineers. These men contact the farmers and assist them in making economical and profitable uses of our services, and also give their time to the possibility of extension of rural lines into other areas.

The chart (offered and received in evidence as Complainants' Exhibit 184) shows by years, from 1923 to 1936, the number of miles of rural lines which the Company had in

operation, excluding, however, 232 miles of rural lines [fol. 192] which had been transferred from rural to urban rates and also excluding 212 miles of line which had been transferred to others.

The Alabama Power Company serves substantially all of the rural and residential demand in its territory. I recently made a particular study of the area within the 100 mile zone of the TVA generating plants on the Tennessee River, and excluding the business which is on our existing lines and the seasonal business, such as cotton gins, there is in that area at the present time only 911 kilowatts of industrial and rural power demand.

The Alabama Public Service Commission has regulations dealing with the minimum requirements under which the Company may be compelled to extend service. The rates, rules and regulations of the Alabama Power Company with respect to its rural electrification are prescribed by the Alabama Public Service Commission. The rural rates are some higher than the urban rates. Generally speaking, the Company is required to extend rural lines whenever the prospective customers enter into a five-year contract to take service for a minimum of $7\frac{1}{2}$ kilowatts per mile of rural line constructed.

A copy of regulations of the Alabama Public Service Commission (offered and received in evidence as Complainants' Exhibit 185) sets forth the schedule of regulations applicable to the Alabama Power Company, respecting the [fol. 193] minimum requirements under which the Commission's rules for extension of rural lines apply. The interpretation or construction which the Commission has adopted has no effect upon the Company's right to construct line extensions which do not meet those minimum requirements which are defined in this regulation. That represents the minimum requirements under which the Company may be, upon complaint of a customer or prospective customer, required to extend a suburban line.

Complainants' Exhibit 184 does not include the Company's rural lines that have been changed to urban rates, nor the rural towns and communities served by the Company at its urban rates. In the progressive extension of our business, electric service has been carried to 460 rural communities which had not been previously served with electricity. As of December, 1936, the Company was serv-

ing over 46,000 customers in rural areas as defined by the United States census.

The Company's electric utility business is continually growing, and in every new field, including rural electrification, the Company must take certain chances in the extension of its system if it expects to grow. It cannot wait until the immediate demand for power justifies each and every single extension. If it had pursued that policy in the past, only a fractional part of the existing markets of the Company would be served. The extension of rural lines has certain engineering and other advantages. They frequently form a part of, or make a loop service, thereby creating a second source of power for consumers, or making available to them additional capacities for their use. Where rural lines are extended to remote areas, they contribute to the improvement of economic conditions in those areas, and they add to the business of the adjacent communities. Demands are set up for new appliances and for wiring, and frequently there follows the purchase of water and sewer-[fol. 194] age systems and the installation of other mechanical equipment. There is a further significance of rural electrification to our business. I think that it adds to the responsibility of our men who operate these various districts. I think it brings them in closer touch with the needs and requirements of the farmers, and thereby makes of them better employees for the Company, and enables them to render better service to the public.

It is frequently the case that when the Company extends a line from some town or community which is the focal point for distribution in that area, and constructs that extension, the Company has in mind the ultimate development or further extension of that particular line of construction. It may be that the extension forms a part of the extension to some distinct community. It may be, as I said before, that it forms a part of a loop service to connect up existing lines in the field of service. In every case where an extension is made in a rural line, it takes electric service that much closer to other areas which perhaps in the future will require electric service. By loop service I mean that a given customer may by reason of his ability to take service over two separate lines coming from different directions, enjoy service from either line. If the lines are connected together at the customer, it would be called

a loop service. It improves the service in the area and it makes available in that area greater capacity of electric service for the use of the customers and those who can be served beyond. When these rural line extensions are made, they offer service from a stable electric system at state-wide uniform rates which gives to the smallest community the same opportunity to attract new industry, the same opportunity to grow and expand that larger cities, served and connected by the Company's system, enjoy.

The rates of the Alabama Power Company are regulated [fol. 195] by the Alabama Public Service Commission and the rates of the Company are uniform throughout the State in the territory which it serves, for all the classes of service. The rates of the Alabama Power Company from time to time have been changed and reduced by orders of the Alabama Public Service Commission and for the period beginning January 1, 1916 and ending January 1, 1937, there have been 94 changes in the rates of the company, of which 88 represent reductions.

No towns or municipalities in the State of Alabama voted to acquire municipal distribution systems during the fifteen year period from 1915 to 1930. Thirty-three municipalities in this area voted to sell their distribution systems to the Alabama Power Company during that same period.

The tabulation (offered and received in evidence as Complainants' Exhibit 186) shows for the years 1916 to 1930, inclusive, the towns or cities in Alabama which voted to sell their electric systems to Alabama Power Company or its affiliated companies, and the date such municipal electric systems were acquired.

The document (offered in evidence as Complainants' Exhibit 187) is a rotogravure, printing, or pamphlet, circulated probably during the latter part of 1934 to customers of the Alabama Power Company by the original Electric Home & Farm Authority.

"Mr. Fly: We object, your Honor, on the ground it is irrelevant and immaterial.

Judge Allen: The Court adheres to the former ruling in this line of proffered evidence. While the former ruling was made in connection with the application for subpoena duces tecum, the ruling of the Court is applicable here. This company, as it appears by agreement of counsel for both litigants, was dissolved over two years ago. The Court

therefore considers this circular issued by that defunct company as incompetent, irrelevant and immaterial.

[fol. 196] Mr. Bemis: If the Court please, the evidence, as already shown, that this agency at the time this material was circulated was a wholly owned subsidiary of the Tennessee Valley Authority, or had the same directors as the Tennessee Valley Authority, Mr. Lilienthal and the two Mr. Morgans.

Judge Allen: But, you were not able to prove at that time any connection between that company and the present company.

Mr. Bemis: That was not the purpose of this testimony.

Judge Allen: The Court adheres to its original ruling. The Court holds this circular is incompetent, irrelevant and immaterial to the issues in this case, and it will not be received in evidence. You may have your exception.

Mr. Bemis: May we, if the Court please, say for the purpose of the record the purpose for which it is offered.

Judge Allen: You have stated that in your application for subpoena duces tecum.

Judge Martin: I think it is already in the record.

Mr. Bemis: I wish merely to state for the purpose of the record—yes, briefly, of course—that this agency, in accordance with the Tennessee Valley Authority's report to Congress, was organized for the purpose of developing the electric power business which the Tennessee Valley Authority expected to serve, and we show what this agency has done in the way of distributing propaganda for the benefit of the Tennessee Valley Authority, and its power project. This is in the nature, of course, of an advertising circular, and the witness has testified that it was widely distributed in the State of Alabama, and the fact is, I believe it was sent to every fourth customer of the Alabama Power Company as well as other companies.

Mr. Fitts: We object to the statement on the part of counsel going into the record, as his offer to prove.

Mr. Fly: Of course neither he nor the witness can know that.

Judge Allen: The statement of counsel is stricken out of the record. The Court adheres to the original rule. You may have your exception.

Mr. Bemis: Yes, but may I add further the purpose is to show by the offer of further evidence, the continuing ef-

fect of the propaganda of the defendant company, and to preserve our exception to the Court's ruling, if we may."

[fol. 197] The pamphlet (offered and received in evidence as Complainants' Exhibit 188) is issued by the Tennessee Valley Authority, printed by the United States Government Printing Office, and describes certain operations of the Tennessee Valley Authority. This document was distributed in Alabama, as I recall, during 1935. Numerous copies of it were sent to our general office by our managers in the field.

The pamphlet (offered in evidence as Complainants' Exhibit 189) was printed by the United States Government Printing Office, was circulated in the State of Alabama by the Information Division of the Tennessee Valley Authority, Knoxville, Tennessee, and has printed on its cover "TVA, Electricity Rates, a statement of facts". I believe that this pamphlet was circulated during the year 1936. It came to our office from numerous of our field managers.

"Mr. Fly: May it please the Court, we object to the introduction of this exhibit. We raise no question as to the authenticity. It appears to have been printed by the Government Printing Office, and therefore we assume that as to authenticity there is no real question. But as to the subject matter being at issue, or relevant in this case, I do raise a question. The subject matter covered by this pamphlet is the rates of the Tennessee Valley Authority. The Court has heretofore ruled that irrelevant, and I therefore object to the exhibit on the ground that it is not relevant, material, or competent, on any issue in the case.

Judge Allen: Counsel for the complainants have heretofore requested the Court's permission to be heard orally upon this question of the competency and materiality and relevancy of rates, as we understand it, both of the Authority and of the Complainant companies. Are you prepared to argue that at this time?"

There followed an argument of counsel in regard to the admissibility of evidence as to rates, during the course of which it was stated by counsel for defendants:

"The Government concedes (1) the wholesale rates of the Tennessee Valley Authority are substantially lower than the wholesale rates of any of the complainants.

(2) The retail rates charged by the municipalities and [fol. 198] cooperatives purchasing power from the Authority are substantially lower than the retail rates of any of the complainants.

(3) The rates charged by the Authority to the rural customers which it serves are substantially lower than the rates for rural service of any of the complainants."

The Court then ruled concerning Complainants' Exhibit 189 for identification as follows:

"Judge Allen: The Court will not receive this pamphlet in evidence. It considers this document incompetent, irrelevant and immaterial.

Mr. Bemis: And we may save our exception?

The Court: In so far as it states the rates of the TVA.

Mr. Bemis: I understand however, the document itself remains, but those parts of it which set forth the rate schedule are excluded.

Mr. Fly: Oh, I objected to the whole. It is a long document, and if we are going to start on the excerpt plan here, it would take some time to go over it. It is in the form of a circular anyway. I think it is wholly incompetent.

Judge Allen: What is in here, Mr. Bemis, what is in this circular except what relates to rates?

Mr. Bemis: Well, if the Court please, it is the same kind of a document as exhibits 187 and 188. It is a piece of advertising, and publicity for the purpose of promoting the power business of the defendants. And we would like to show it for that purpose, and we offer it for the same purpose that we stated we offered 187.

Mr. Fly: 187 was the E. H. F. A., which was ruled out, your Honor. The other, 188, was the statement of Tennessee Valley Authority, concerning the functions of each of the dams, the different functions performed by the Authority, whereas the statement now presented is a detailed discussion of rates and of costs, and of the different items going into them. In just glancing it over I do not see any item in there which does not go to rates and costs and valuations and that sort of thing.

Judge Allen: The entire circular will be excluded. The Court considers that the gist of this circular is rates, and that it falls under the ruling of the Court.

Mr. Bemis: And we may have our exception.

Judge Allen: And you may have your exception.
 [fol. 199] Mr. Bemis: And we would like to have the record show that we offer this exhibit both in its entirety, and that we have an exception to the Court's ruling as to that.

Judge Allen: You may have your exception to the ruling, and the Court excludes the entire pamphlet, because the heart of the pamphlet is rates.

Mr. Bemis: And we would like also for the purpose of the record to state that this pamphlet shows on its face that among other things the defendants in this particular piece of publicity attacked the complainants and their business, and that is one of the allegations of the bill of complaint, that they have spread propaganda relating to the complainants, and affecting their good will and business. Among other purposes it is offered for that purpose.

Judge Gore: Where in this does it affect the complainant companies?

Mr. Bemis: Well, I may be mistaken, if your Honor please.

Mr. R. T. Jackson: If the Court please, Government counsel, in answer to a question from the Court read some concession, which I assume to be part of the basis of the Court's ruling. And I would like to inquire of Government counsel whether that concession, using the word "substantial" is understood to mean 30 or 40 per cent, or what it does mean.

Mr. Fly: That means whatever it means in the recognized dictionaries and law books.

Mr. R. T. Jackson: I guess that is nothing.

Judge Allen: Mr. Jackson, the Court has in mind constantly in this case that there are a large number of complainants here; the fact that an attack is made upon the bill upon the ground it was multifarious.

Judge Gore has previously held in this case that the bill is not multifarious upon the ground that while the complainants may be interested in the outcome of the litigation in varying degrees, and the alleged injury threatened to be inflicted may not be uniform, the relief sought by each and all of the complainants is similarly predicated upon the same alleged unlawful and unauthorized acts of defendants. The Circuit Court of Appeals of the Sixth Circuit sustained the district Court in this holding. Now.

unless all of the complainants fall into substantially the same category as to their legal rights, the bill is multifarious and each of the complainants must have its rights adjudicated separately. The Court considers that the concession made protects the complainants and places them in substantially the same category with reference to the question of rates, and therefore the court considers that to pursue this question of rates with reference to the rates of the TVA and the rates of the various, multifarious complainants, would be going into an infinite amount of detail, [fol. 200] whereas the ultimate conclusion would be fairly expressed with reference to these complainants by the concession made that the rates are substantially lower, both wholesale and on resale.

Mr. Jackson: I was only trying to enlighten myself, if your Honor please, and see if we could have something—

Judge Allen: I made that explanation to you because the Court is endeavoring to carry out the holding of the District Court and of the Circuit Court of Appeals, that you all have a common interest, and we are endeavoring not to go into the diversities of the peculiar situations, except in so far as may be competent, material and relevant under this bill in which you allege that you have a common interest. That is the basis of this ruling.

Mr. R. T. Jackson: I understand the Court perfectly. And I am not trying to raise any question about the ruling. I was only trying to get a better understanding myself of the concession, because "substantial" is a rather nebulous word, and it ought to be fairly simple to agree upon 30 or 40 per cent. The other question was whether it was an inadvertance that the counsel said nothing about the industrial rates.

Judge Allen: Is the same concession made concerning industrial rates?

Mr. Fly: May it please the Court, we will concede that the Authority's rates to the industrials are substantially lower than the published rates of the complainants.

Judge Gore: Mr. Bemis, what did you say about this exhibit?

Mr. Bemis: The reference is there to alleged write-ups, and so forth, exposed by the Federal Trade Commission, and other statements with reference to Complainants.

Mr. Fly: Do you want to go into the truth on that, Mr. Bemis? I don't think this Court does.

Judge Allen: The Court adheres to its ruling. The entire document will be excluded.

Mr. Bemis: We preserve our exception."

The pamphlet entitled, "Development of the Tennessee Valley" (offered in evidence as Complainants' Exhibit 190), was issued by the Tennessee Valley Authority and circulated in the territory in which the Alabama Power Company operates in the latter part of 1935 and the early part of 1936.

[fol. 201] "Mr. Fly: What is the purpose, please?

Mr. Bemis: The same purpose that has already been stated with respect to exhibits 187, 188, and 189.

Mr. Fly: This entire circular, your Honor, I have not had time to examine it in detail. I do not recall having seen it before, but I would object to it on the ground it is immaterial and irrelevant. I think it comes within the scope of the Court's previous ruling in that regard.

Mr. Bemis: There is no question about it having been published and distributed by the Tennessee Valley Authority, is there?

Mr. Fly: I do not know. I assume that it was published and distributed, but it comes in the same category as press releases, speeches and circulars, which the Court has already ruled upon.

Mr. Bemis: Well, it is obviously, if the Court please, a piece of advertising which was distributed for the purpose of promoting the electric power business of the defendants.

Mr. Fly: And again, if your Honor please, there is great danger of throwing in documents of this kind without careful scrutiny, or we will get in multitudinous subjects the Court has ruled out. This, for example, goes into rates, and I believe goes somewhat into costs, the last two pages seem to get into that field.

Mr. Bemis: In those respects, it states the facts, as you understand them.

Mr. Fly: No, I would not say that it does. I do not know whether it does or not. If we vouched for every piece of reading, which you could produce here, we would find ourselves in a great many different positions.

Mr. Bemis: Of course, that is the very thing we are complaining about, that its advertising is deceiving.

Mr. R. T. Jackson: It states the facts, as given to the public.

Mr. Fly: I do not know.

Judge Allen: What is the number of this proposed exhibit?

Mr. Bemis: Complainants' Exhibit 190.

Judge Allen: The Court considers that this exhibit falls within its previous ruling, and it will be excluded. You may have your exception.

Mr. Bemis: We preserve our exception."

[fol. 202] During the last four and one-half years, 18 municipalities in Alabama have voted to acquire or construct municipal electric systems. The tabulation (offered and received in evidence as Complainants' Exhibit 191) lists the names of the Alabama municipalities voting to acquire electric systems in the years 1933 to 1937, giving the population of the towns and the date of each election. It also shows, by the asterisks following the name of the town, those towns voting to acquire an electric system which were not served directly by the Alabama Power Company. Approximately 47,000,000 kilowatt-hours were sold during the year 1936 to the 13 towns which are now receiving their service direct from the Alabama Power Company. This represented approximately \$965,000 in gross revenue to the Alabama Power Company. I would like to say further in connection with the kilowatt-hours mentioned and this revenue, that the period covered for the information given was for the year 1936 for all towns excepting the towns of Florence and Tuscumbia, Alabama, and in the case of those two towns, the information included was given for the last year of operation of those systems by the Alabama Power Company.

"Mr. Bemis: Now, if the Court please, for the purpose of our record, I would like to submit to the witness a couple of questions on the question of rates, if we may."

.

The memorandum (offered in evidence as Complainants' Exhibit 192) prepared by me shows what differentials there are in the rates of the Alabama Power Company and those generally in force in the State of Alabama by or through the Tennessee Valley Authority.

"Judge Allen: Let us see the exhibit. The Court will ask counsel for complainants whether it would answer their

purpose if the record shows that the witness if permitted to answer would have testified that the differential in the rates between the rates of the Tennessee Valley Authority and those of the Alabama Power Company for residential services varied from 25 cents for 15 monthly kilowatt hours, to \$1.60 for 500 monthly kilowatt hours; and for commercial service it varied from \$1.80 for 50 monthly kilowatt hours to \$65.20 for 3000 monthly kilowatt hours; and varied for [fol. 203] rural service from 50 cents for 15 monthly kilowatt hours to \$5.47 for 2,000 monthly kilowatt hours; and for industrial service it varied from \$160.50 for 30,000 monthly kilowatt hours to \$1415.00 for 400,000 kilowatt hours.

Mr. Bemis: If we could also show the percentage of difference, if the Court please, in these various classifications of service.

Judge Allen: And that the percentage varied in residential service from 25 to 18.8 per cent; in commercial service from 41.9 per cent to 61.8 per cent; in rural service from 40 per cent to 14.4 per cent; and in industrial service from 29.9 per cent to 37.2 per cent.

Mr. Bemis: I think that is satisfactory. And for our record, may we have the Court's ruling on that subject, and except, as I understand the exhibit is objected to.

Judge Allen; And excluded under the previous holding of the Court."

.

"Mr. Bemis: Mr. Stanley, assuming that two competitive power systems are operating in the same general area, what in your opinion would be the effect of the promulgation of substantial lower rates by one competitive system upon the rates of the other system, if such other system had uniform rates?

Mr. Fly: I object to that question as immaterial, irrelevant and incompetent.

Judge Allen: Objection sustained.

Mr. Bemis: Of course, if the Court please, I would like to state that the purpose of this testimony is to show both damages and rate regulation. And, may we have our exception?

Judge Allen: You may have your exception.

Mr. Bemis: And the offer to prove that the witness, if permitted to answer, would testify where two competitive power systems are operating in the same general area, the effect of the promulgation of substantially lower rates by one of such competitive systems would inevitably reduce or regulate the rates of the other system to the same level.

Q. To what extent, Mr. Stanley, in your opinion, is this true in the case of industrial consumers served by the system having the higher and uniform rates?

Mr. Fitts: The same objection.

Judge Allen: The same ruling, objection sustained.

Mr. Bemis: Exception, and offer to show that the witness, if permitted to answer, would testify that in view of the competitive conditions affecting industrial operations that irrespective of duplication of service, the reduction of rates [fol. 204] in an area where other businesses are competing of the same or like character, is inevitably to compel a reduction in rates to the same and uniform level.

Q. Mr. Stanley, where two competitive power systems are operating in the same territory without any actual duplication of service, what, in your opinion, would be the effect of the promulgation of substantially lower rates by one of such competitive systems upon the rates of the other system?

Mr. Fly: Objection, irrelevant, incompetent and immaterial.

Judge Allen: The same ruling; objection sustained.

Mr. Bemis: An exception, and an offer to show that even where there is no direct competition or duplication of service, that the inevitable effect of the promulgation of a lower, substantially lower rate in the same area is to compel the reduction of the rates of the company charging the higher rates; that this is due, among other reasons, to the importance of the good will which the company must have on the part of its customers."

In the case of the thirteen municipalities which, as I have testified, have held elections to acquire their own distribution systems to take TVA power, I am able to state the circumstances under which those elections were called.

The document (offered in evidence as Complainants' Exhibit 193) is a photostatic copy of a contingent power con-

tract for residential, commercial and industrial customers, circulated among the customers of the Alabama Power Company at Albertville, Alabama. I saw this contract at a meeting of the Council in Albertville on the night that the election was called, so that the citizens might vote on the question of acquiring a municipal distribution system. I saw the contracts with my own eyes. I saw a stack of contracts signed by our customers purporting to represent 90% of them. The stack of the contingent contracts was at least eight or nine inches high. The Mayor of Albertville made a statement in regard to the number of contracts which had been signed.

[fol. 205] Examination by the Court:

I did not see this contract circulated, but it was not merely reported to me. I saw it presented by a committee of citizens who were our customers at Albertville, Alabama, to the town Council of Albertville, on the night that they requested that an election be called to vote on the question of acquiring a municipal distribution system. I examined the stack of signed contingent power contracts, such as this is a verbatim copy of, and saw that they were signed by our customers. And my estimate is that the number of contracts that were in that stack signed on the Mayor's table that night represented 90 per cent of the Alabama Power Company customers at Albertville.

"Mr. Fly: I will object to it, your Honor, on the ground that it is irrelevant and immaterial and incompetent. It is not shown that the Authority had a thing to do with the meeting, or with the circulation of the contract. It is not shown that the activities of the members of the City Council are in any way binding upon the Authority, and I don't think that it is at all pertinent to go into the activities of the City Council under those conditions, and I further object to it on the ground that this witness has not come anywhere near authenticating this as the contract which he states has been signed by a group of people.

Mr. Bemis: If your Honor please, to keep the record clear I now offer this document as complainants' exhibit No. 193, and we would like to state to the Court that we do not offer this as a contract which was circulated by the defendants in this case. The purpose of this offer is to show two things: It shows on the face of it, and from the

recitals of consideration, that the moving consideration for the election and vote in this case was the lower rates which would be provided through the purchase or acquisition of a distribution system to use Tennessee Valley Authority power. It further shows that the customers of the Alabama Power Company have contracted to buy all of their future requirements for a period of ten years from the municipal plant, at the time when this service is finally provided. And in consequence—

Judge Allen: Where does it show that? Where does this show that?

Mr. Bemis: It is in paragraph 1. The statement is he will purchase his entire requirements of electric energy from the city for a period of ten years, beginning as soon as the service is available.

[fol. 206] Judge Allen: Where does this say anything about purchasing from the Alabama Power Company?

Mr. Bemis: There is nothing in the contract to show that the customer is now purchasing directly from the Alabama Power Company, but the witness has so testified.

Mr. Fly: I think it is perfectly clear, your Honor, he is trying to prove a state of facts here based upon this document which has not and cannot be authenticated, and if it were authenticated it would still be a matter of pure hearsay, and if it were authenticated and were not hearsay, it would involve the activities of the City Council. And certainly they cannot pull themselves out of a situation like that by the statements of the City Council which are brought in here second hand, unless it has some connection with the Authority.

Judge Martin: Mr. Bemis, do I understand that you offer this document with the statement that you intend to show that TVA, the defendant, Tennessee Valley Authority, was in any manner responsible for the circulation of it.

Mr. Bemis: Not directly. We, of course, consider that it shows the effect of TVA activity in this region.

Judge Martin: Well, that is a different matter.

Mr. Bemis: The purpose of this offer—

Judge Martin: I am asking if you are offering this document on the basis of a subsequent showing directly that the TVA was connected with it, directly with the distribution of this proposed contract.

Mr. Bemis: No, it is not claimed, if the Court please, that the Tennessee Valley Authority is directly connected with the distribution.

Judge Allen: Are you making a formal objection?

Mr. Fly: I have, your Honor.

Judge Allen: The objection will be sustained. Mr. Bemis, in order that you may be informed of the basis of the Court's ruling, the Court rules complainants' Exhibit 193 must be excluded. The reason is that you state you can show no direct connection between the Tennessee Valley Authority and this exhibit, and the Court feels that unless such a direct connection is shown that we should not take time to go into some 20 or 18, or whatever it is, municipal elections which are conducted by independent municipal agents.

Mr. Bemis: Of course, it is understood, if the Court please, that we claim that this is the result and the effect produced by the activities of the defendants.

[fol. 207] Judge Allen: We are making this ruling on the basis of your statement as to what you could prove. It may stand, the ruling may stand, and the exhibit is included.

Mr. Bemis: And we are allowed our exception?

Judge Allen: And you are allowed your exception. Let the record show that counsel for the complainants did not claim that this exhibit was circulated by the Tennessee Valley Authority and that he did not expect to show any direct connection between the circulation of this exhibit and the Tennessee Valley Authority. Is that the effect of the statement, the fair effect of the statement?

Mr. Bemis: And may we have the record show that it is the position and contention of the complainants that these contracts were circulated and distributed as a direct result of the invitation of the Tennessee Valley Authority, as will be shown by evidence, as appears from evidence which has already been introduced, and further evidence which will later be introduced, and that this is the direct effect of such solicitation. We claim that as an inference from those facts.

Judge Allen: That is—

Mr. Fly: That is much broader than he stated before.

Judge Allen: That is much broader than you stated it before, Mr. Bemis. Will you try to say what you said before?

Mr. Bemis: We don't claim, if the Court please, that employees of the Tennessee Valley Authority actually distributed these contracts from house to house, and procured the signatures. Now, that is what I-intended to say.

Judge Allen: Now we didn't ask about house to house. We asked whether you could show any direct connection between the Authority and the circulation of these contracts. And what is your answer?

Mr. Bemis: And I believe I answered that we were not claiming that the effect was direct, and I meant that in the sense that we are not claiming that we have any proof to show that the Tennessee Valley Authority procured the circulation of these by any direct action, but that this is the result of the invitations which have been given to promote the power business.

Judge Allen: Let the record show that the Court, the three members of the Court understand that counsel for complainants stated that they were unable to show any direct connection between the circulation of these contracts and the Tennessee Valley Authority.

Mr. Bemis: And may I explain what I intended by that statement if the Court please, for the purpose of the record?

Mr. Fly: I think we have had enough explanation.

Judge Allen: The ruling stands and the explanation stands.

Mr. Bemis: And we may have an exception?

Judge Allen: Yes.

[fol. 208] Q. Mr. Stanley, was this same method, or a similar one followed in the instance of the other towns in Alabama which voted to engage in the electric power business?

Mr. Fly: I object to that, unless he shows that he has personal knowledge.

Judge Allen: The objection is sustained.

Mr. Bemis: An exception, and offer to show that the same method was followed in the other municipalities which have voted to acquire distribution facilities for the use of Tennessee Valley Authority power.

Judge Martin: That would not quite cover your record since the objection was based first on lack of personal knowledge on the part of the witness. If you want for the purpose of your record to incorporate into his knowledge of the

other cities, I think you should do so, otherwise I think the exception would not be preserved.

Q. Mr. Stanley, did your knowledge of the facts with reference to the distribution of other similar contracts in these other municipalities come to your attention in your capacity as vice president in charge of the customer relations?

Mr. Fly: That is irrelevant, your Honor. Can't we find out what the witness knows about the particular town and the meeting, and what he saw.

Mr. Bemis: That is the most we can show by the witness. Then if the Court sustains the objection we would like to be allowed our exception, and offer to show that the witness' knowledge in respect to these other twelve municipalities did come to him in the ordinary course of the business as Vice President in charge of customer relations.

The Witness: I think, Mr. Bemis, that it should be said that there were perhaps two or three of the thirteen towns that did not circulate this type of contract. Substantially all of the other towns did circulate it.

Mr. Bemis: May we have the record show the witness' correction of our offer to prove?

Mr. Fly: I object to any suggestion that the witness has stated the same degree of familiarity as to the other towns as regards Albertville."

Examination by the Court:

I did not at any time see anyone circulate any of these contracts. I did not at any time see anyone sign any of these contracts. I saw the contracts in their signed form at [fol. 209] Albertville. I didn't actually see the act of signature when our customers signed these contracts.

Direct examination continued:

Prior to the entrance of the Tennessee Valley Authority into the business of generating and selling electricity our Company did not lose any of its industrial customers or industrial power business to other agencies distributing electric power in the State of Alabama. Since the entrance of the Tennessee Valley Authority into the business of generating and selling electricity, the following industrial power business has been lost by our Company to the Tennessee Valley Authority or other agencies using Tennessee Valley Authority power.

Excluding industrial business lost pursuant to the contract of January 4, 1934, with TVA, the Company has actually lost the sale of power required for the production of phosphoric acid by Monsanto Chemical Company at Anniston, Alabama, amounting to \$387,000 based upon the last year of acid production while taking power from our lines. In addition, the company has received written notices from Rockwood Alabama Stone Company, the Aday Quarry near Russellville, Alabama, and the Decatur Iron & Steel Company of Decatur, Alabama, that they are terminating their power contracts. The business of these two industrial customers for the year ending July, 1937, amounted to \$9,500.

Examination by the Court:

We had a contract with the Monsanto Chemical Company at Anniston. The contract does not expire until some time in April of next year and provides by its terms for the purchase of power from our Company for the production of phosphoric acid by the electric furnace method.

[fol. 210] Direct examination continued:

The Monsanto Chemical Company has constructed an electric furnace plant at Columbia, Tennessee, for the production of phosphoric acid, and is producing at that point, with power purchased from the Tennessee Valley Authority, phosphoric acid which it previously produced at Anniston, Alabama, with power purchased from our Company.

The letters (offered in evidence as Complainants' Exhibits 194 and 195) are the original letters from two of our industrial power customers, one, the Rockwood Alabama Stone Company, of Russellville, Alabama, for its Aday quarry, and the other from the Decatur Iron & Steel Company, of Decatur, giving to the Company six months notice of termination of their agreements to purchase power from the Company.

"Judge Allen: They will not be received. The Court considers them inadmissible. The persons who wrote them are not here to testify to them. But the Court considers that this witness may testify as to the fact that his company was notified to discontinue the service. You may have your exception.

Mr. Bemis: Yes, Ma'am."

Cross-examination:

Fifty thousand cotton bolls is 50,000 bolls of cotton. I do not know a great deal about cotton. I do not think the value of the souvenirs would have anything to do with the interest that it would create for the purpose of distribution. I think many people in the New England states never saw a boll of cotton on the stalk, and it was quite a novelty for them to see it, and it created interest in the subject. That is the reason we distributed them, not because it cost us a lot of money. I did not mean to make a claim of a great expenditure on behalf of the community. If I made that impression, I would like to correct it.

[fol. 211] "Q. Mr. Stanley, you stated that your company lost a part of the load of the Monsanto Chemical Company at Anniston. With what corporation did your company originally contract to furnish that service.

A. Mr. Fly, I don't know that I can give you the answer specifically to the question as you have asked it for the reason that the company has furnished electric service for the production of phosphoric acid to this particular plant at Anniston—

Q. Tell me whether or not—

A. —but I can tell you the name of the company with whom the present contract was entered into, if that is what you wish to know."

The contract under which service was being rendered by this Company for the production of phosphoric acid at the electric furnace plant at Anniston was a contract between the Alabama Power Company and the Southern Manganese Company, which contract had been transferred to the Monsanto Chemical Company. And during 1935, the Company did furnish the Monsanto Chemical Company electric energy at Anniston under that contract for the production of phosphoric acid. The power contract under discussion was assigned to the Monsanto Chemical Company, a Delaware Corporation, on December 1, 1936. Prior thereto, service to the Monsanto Chemical Company was to the Alabama corporation of the chemical company. If it is true that the TVA contract with Monsanto Chemical Company of Delaware was made on May 15, 1936, then it is a fact that at the time the contract was made with the Delaware corporation our Company was rendering service under a contract with

the Alabama corporation. I do not know the precise stock relationship between the Alabama and the Delaware Monsanto Companies. I did not assume anything in regard to the form of stock control or that those were the same business organizations. We are still serving the plant at Anniston. We did not reduce the power deliveries at Anniston. The Monsanto Chemical Company reduced the take of power at Anniston. We have exercised our right to discontinue the service of "when available" power under the contract [fol. 212] tract. This was done in July, 1937, and we have done it in previous years. The contract provides for that. The Monsanto Chemical Company would have, I think, liked to have used the power all along. I did not, however, suggest to the Chemical Company that they arrange with the Authority to furnish power which might be in turn transmitted down to fill their needs. I had the negotiations on behalf of the Alabama Power Company with the Monsanto Chemical Company concerning this power contract, and concerning the discontinuance of the "when available" power, which the contract gives the Company the right to discontinue. At no time during my discussions with them was any suggestion made by me as an officer of the Company that any power of the TVA might be transmitted to Anniston for the purpose of operating the electric furnaces there. I do not know what other officers of the Company did in that regard.

Our Company is not in the regular business of supplying industrial plants in Tennessee. I testified that the Monsanto Chemical Company had built an electric furnace plant to produce phosphoric acid at or near Columbia, Tennessee, and that they had contracted with the TVA for power to operate these furnaces, and that the TVA was delivering power to these furnaces. I do not know whether it is a Tennessee corporation of Monsanto or whether it is a Delaware corporation. The new plant is near Columbia, Tennessee. I do not know where the Anniston plant gets its raw materials, its phosphate rock, for the production of phosphoric acid, unless the question is limited to a particular period. I have knowledge of their obtaining phosphate rock from different locations over the years. I am not positive about 1936 or 1937. I do not know it to be a fact that the bulk of it came from the phosphate rock beds in Maury County, Tennessee. Nor do I know it to be a fact that those

phosphate beds contain the best and most ample supply of [fol. 213] phosphate east of the Rocky Mountains. There are also phosphate beds in Florida that are supposed to be of a very large extent and of a very high grade. I do not know the facts, however, with regard to either location.

When I referred to our uniform rates throughout the state under statewide regulation, I did not mean that all of our rates are the same as the various rates of the various companies doing business in the state and applying to the same class of customers. I just had reference to the rates of Alabama Power Company.

I am not very familiar with the communities of Waterloo and St. Florian, in the vicinity of Wilson Dam. I have never been to either of them. I do not recall whether the citizens of Waterloo, with a population of about 500, presented a petition to our Company about 1929, asking for service. It is true that we have not served Waterloo and St. Florian, but I am not aware whether at the present time ninety rural residents of Waterloo and fifty in St. Florian are receiving service.

Referring to Complainants' Exhibit 185, which is the rate schedule of the Alabama Power Company for suburban service, I do not think the proceeding before the Alabama Public Service Commission as to the rate in its present form was a contested one. It is not the schedule which was presented for the Commission's approval. The designation, Alabama Power Company No. 1, is the designation given to the sheets in our published rate books, which are on file with the Commission, after the approval of the rates by the Commission, and they are on file in each of our offices for the inspection of the public.

I would like to answer the question as to who participated in this particular proceeding by giving a brief explanation of the circumstances surrounding that classification in its present form. Originally, the Power Company submitted certain rates for rural or suburban service to the Commission [fol. 214] sion, with the request that they be approved. They were not approved in the form submitted. Discussions were had, and in some previous cases there were hearings and as a result of those discussions and hearings a rate was promulgated by the Commission and approved by it. Then later there have been certain amendments and changes in the rates. The amendments and changes have been made

and have been approved by the Commission in separate actions, other than the original hearing. I think the Company took the initiative in proposing this rate schedule or a rate schedule of that type. The record, that is the printed material on the schedules, will show whether the matter was brought up as early as September, 1935, and whether this particular schedule was approved December 17, 1936.

We do not always require contracts for minimum consumption of $7\frac{1}{2}$ kilowatts per month per mile, or at least $1\frac{1}{2}$ kilowatts per customer, as a matter of practice. There are exceptions to the rule made by the Company in a number of cases. In my testimony regarding rural communities I was using the Census Bureau's definition of rural communities, and that included towns of less than 2,500 population. In discussing farm electrification, I gave no testimony to the effect that the definition boiled down to a person who owned or farmed at least 3 acres of land and relied upon it as a source of livelihood. I testified, I think, that we had, at the end of last year, 15,600 rural customers. These rural customers are on rural lines, served by those rural or suburban rates that I have just discussed. There are farms covered by the government classification and there are farms that do not conform to that classification. Then there are churches and schools along the route that are just as much an institution as the farms themselves are, and they are all called rural customers according to our classification.

We have been asked by the Edison Electric Institute on several occasions, and we have also been asked by the Federal Power Commission, to report the proportion of the farms in Alabama which we served on June 1, 1933, referring strictly to farm electrification, as defined by the Census Bureau, but our Company serves about 150,000 square miles of territory in the state of Alabama and we estimate that it will cost us \$3,500 to make a farm census in the territory that we serve. We have never felt that the information that will be gained by such a census was worth the cost of that money and therefore we have never made it.

Prior to 1933, we had many comprehensive rural systems, as distinguished from lines between communities where we picked up customers along the way. We were active in our rural electrification for almost ten years before that.

I filed as an exhibit in this case (Complainants' Exhibit 184) a chart showing the number of miles of rural lines that

we had in operation at the end of the various years and I think it speaks for itself. About 50% of our rural lines which were in operation at the end of 1936 were constructed during that year. Immediately prior to 1936 there was a lull in the construction of rural lines in the State of Alabama just as there was a lull in all business.

I do not have the figures with me and cannot tell how many miles of single phase rural line we had at the end of 1933. It is not always true that the single phase lines are commonly used for farm territory as distinguished from the three phase lines which connect the towns and villages. It may be generally so, but not always. The figures that I have available are applicable to the state as a whole. I do not have the breakdown figures with me.

As a matter of geography, the Rockwood Alabama Stone Company is in the ceded area covered by the contract of January 4, 1934, which has since expired. I think it is in Franklin County.

[fol. 216] Examination by the Court:

It falls within the lines that were retained by the Alabama Power Company and not conveyed to the TVA. That is the reason for my hesitancy about describing it as being within the "ceded area."

Cross-examination continued:

I did not assign that contract to the TVA. I do not think it is true that it is served by the very lines we conveyed to the TVA. I am not absolutely positive, but I do not think it is so served.

The Aday quarry, which I mentioned, also belongs to the Rockwood Alabama Stone Company. Taking the geographical limits of the entire "ceded area" as a whole under the contract of January 4, 1934, using the outside of every county as a boundary line, there can be no question but what the Aday quarry of the Rockwood Alabama Stone Company is located within the area. But as I stated, it was not served by the lines conveyed to the TVA. It was served from the lines retained by the Alabama Power Company.

The Decatur Iron & Stone Company is in Morgan County. It is in the city of Decatur, in the "ceded area." I have

not seen any contract between the Decatur Iron & Stone Company and the Tennessee Valley Authority.

Referring to Complainants' Exhibit 191, listing the towns voting to acquire electric systems from 1933 to 1937, there are nine of these towns within the ceded area, and they all held their elections prior to the contract of January 4. I do not recall when the Carmichael Act was passed. I know that the act referred to authorizes municipalities to acquire, construct and operate distribution systems, but I do not remember when it was passed. According to the check I have made, there are six of the towns listed on Exhibit 191 outside the ceded area which are [fol. 217] served directly by the Alabama Power Company, including Guntersville, Oneonta, Enterprise, Scottsboro and Albertville. I do not know it to be a fact that any of the towns other than Guntersville has a contract with the Authority. I never heard of any movement towards public ownership which was in existence at Guntersville prior to the passage of the Tennessee Valley Authority Act.

In Complainants' Exhibit 182 I spoke of 204 industries which had settled in the area of my Company since 1925. I did not bring the figure with me as to the total amount of energy in kilowatt-hours which was sold to those industries in 1936. I had a check made to determine the part of our industrial revenue that the new industries contributed during the year 1936, and I testified that the percentage was over 25% of our total industrial revenue for the year 1936. In estimating the potential demand of 911 kw. within 100 miles of the Authority's dams, I figured on the existing demand and did not consider the possible increase in demand, nor the influx of new industries or operations of that sort. I had our Rural and Towns Division make a survey of the rural revenue. They are experienced agricultural engineers who have been doing that class of work for the Company for years. And I had our power sales engineers do the same with regard to the industrial power loads, and then I took these two surveys, and with my general knowledge of the territory that I have been familiar with for years personally, I made the calculation which I gave yesterday in my testimony.

Redirect examination:

The Monsanto Chemical Company contract, as I recall at the present time, is for 28,500 kilowatts of total load,

of which only 4,000 kilowatts is primary power. By primary power, I mean power that must be kept available [fol. 218] every day during the year for the customer's use. The remaining part of the power is of several different classes and it is available for varying numbers of months during the contract year. Some of it is subject to shut off by the Company on short notice. The curtailment that was made in the power for this customer was made pursuant to the terms of the agreement which both the consumer and the Company understood and I think both of us are satisfied with. That is as to shut offs.

"Q. Now, prior to the time when Monsanto Chemical Company moved its phosphoric acid operations to Tennessee, was there anything said in regard to their reasons for doing so?

Mr. Fly: I move to strike that. There is no evidence in this record that that company moved any operations to Tennessee.

Judge Allen: Objection sustained.

Mr. Bemis: Exception and offer to prove that if the witness were permitted to answer he would testify that the Monsanto Chemical Company did call the Alabama Power Company into a meeting.

Judge Allen: Now, Mr. Bemis, the Court feels that for the benefit of the litigants and for the benefit of the Court, as constituted, that this statement should be made in compliance with the equity rules, and be very simple.

Mr. Bemis: You mean that the counsel should make the statement, but that it be a summary?

Judge Allen: If counsel will not make the statement as indicated by the Court, then the Court will have to make the statement. I want to call attention to both litigants to this situation again, that in this three Judge case, we have a Judge drawn from the United States Circuit Court of Appeals. That Court is compelled for the next session of court to borrow a Judge from somewhere, and perhaps will be compelled again for another, or we don't know how many other sessions of the court to borrow a Judge from somewhere; the Dockets of two District Courts are held in abeyance while this case is proceeding. We think, therefore, that there is a strict public policy, not only in favor of the convenience of the litigants, but in favor of the administration of the courts, of our conducting this

particular case so as to preserve every right of the litigant, but so as to dispose of the case. Now, what you are entitled to under the equity rules is that the Court shall clearly state the nature of the testimony rejected. That [fol. 219] does not require a paragraph, in the opinion of the Court, on either side, it does not require a paragraph.

Mr. Bemis: We will endeavor to cooperate with the Court in that direction.

Mr. Bemis: (Continuing) That the witness would testify if permitted to answer, that the Monsanto Chemical Company did state the reason for moving its phosphoric acid operations, and that the reason given was that it was going to purchase power from the Tennessee Valley Authority, which could be purchased at 1 mill lower than the price at which the Alabama Power Company was selling under this contract.

Judge Allen: The Court wishes the record to show that this evidence is excluded upon the ground that it constitutes hearsay, and that it is incompetent, irrelevant and immaterial under the law applicable to the case.

Mr. Bemis: To which we have reserved an exception.

Mr. Fly: May it please the Court, I just want to state we want the final record, when it is made up, I shall ask the Court to let it appear that I directed attention to the matter that the Monsanto Chemical Company doing business in Alabama and the Monsanto Chemical Company doing business in Tennessee are different corporate entities."

With reference to exceptions made to the minimum requirements of the Alabama Commission, respecting rural line extensions, there have been cases where an amount less than the capacity requirements set out in the schedule have been signed for by the customers, and not more than the capacity requirements set out. I do not mean that we have in any instance violated the minimum requirements as set forth in that regulation. The regulation says that we may make exceptions below the requirements of $7\frac{1}{2}$ kw. per mile. My testimony, as I gave it yesterday, was intended to show that we had done that very thing in certain instances.

At this point complainants moved for an order requiring the defendants to produce all contracts that had not been delivered, whereupon the following occurred:

[fol. 219a] "Mr. Fly: I believe under those circumstances, Mr. Jackson ought to make a showing that we have failed to deliver some of them, before this Court is called upon to make a formal order which challenges the good faith of the Government in a matter of this kind, on which we make every effort to cooperate.

Judge Allen: The Court feels that good faith and cooperation have been shown on both sides. It is the understanding of the Court that the contracts, the amendatory contracts also will be delivered. The Court also knows that there is a vast amount of documentary material to be checked up and delivered.

Now at the present time the Court will make no order but it will demand the cooperation of attorneys on both sides of the case in producing this evidence, and we will assume that the Government will check these documents as fast as possible, as fast as is reasonably possible, and will deliver them all."

(The witness was excused.)

The new contract between TVA and the Alcorn County Electric Power Association dated June 3, 1937, was at this point delivered to complainants by counsel for defendants, and was offered and received in evidence as Complainants' Exhibit 196.

"Judge Allen: Now, in line with what was just stated concerning the public policy of continuing with this case, the Court, in thinking over the possibility of all of the ramifications and evidence, has concluded, in the light of the law of the case, and the holding that the bill is not multifarious, that all of the complainants are in substantially the [fol. 220] same category, and bearing in mind the allegations of the bill, we feel that a fair picture of the whole situation along the lines of the testimony of Mr. Stanley with reference to the Alabama Power Company is presented by the typical case of the large power company, and the typical case of the small power company. Now the Court does not mean by that there won't be an opportunity given to supply testimony to preserve the record, or evidence to preserve the record for each of the companies, but we do

feel that if we can get into this record a typical case of a small power company we can go forward more rapidly.

Mr. Bemis: You mean with a witness that would testify in regard to the organization and activities?

Judge Allen: Yes, the organization, growth, capitalization, activities, rates and so forth, which we have held to be inadmissible, but which you have a right to offer to prove, of a small power company.

Mr. Bemis: Well, I am not too sure that that could be done at this time, if the Court please. We appreciate the Court's suggestion and will follow it. But I do not know that we are prepared to do that at this time.

Judge Allen: Well, then, have you something else, not along that line, with which you could now go forward?

Mr. Bemis: We have other witnesses who we are prepared to call at this time, yes.

Judge Allen: Is it along the line of the testimony, the general line of the testimony of Mr. Stanley? We thought that we were making it plain, we are prepared to hear in detail, with the liberality which the Court has already shown, testimony concerning the growth, capitalization, operation, line of service, and all of the rest of it, of a large power company and a small power company, and to consider those as typical, and to preserve your rights under the record with reference to every one of the complainants.

Mr. R. T. Jackson: If it is appropriate, I would like to state what we had planned to do and our situation, to see whether the Court approves of it.

At the outset I want to say that in offering testimony for the Alabama Power Company through Mr. Stanley, we had not intended to initiate a line of testimony which would take this Court through a repetition of that testimony for each plaintiff in this case. We had intended to offer that as typical to the Court. The Court suggested that that would be sufficient. We then had not intended to go further with the typical testimony of a small company, such as one serving a metropolitan area, because it had seemed to us that [fol. 221] testimony such as that of Mr. Ford for the Memphis Power & Light Company had perhaps adequately covered the field from the point of view of that type of company, which was covered by Mr. Stanley in relation to the Alabama Power Company.

We will, however, be, of course, glad to check that and see whether there is anything else that ought to be brought

out from a small company to make it strictly comparable to what was brought out from the Alabama Power Company, because the Court in suggesting that, must have thought there was something lacking in that respect that we had not realized. Now, if the Court feels that there is, and wants that done, we will be glad to send for persons able to give us that information and have it ready this afternoon. We had not thought of that at all.

Now the other testimony that we had planned to follow along here with is not intended, and in our judgment does not duplicate what Mr. Stanley has given, in any way. We intend to follow out a line of testimony which we think will be illustrative of particular angles of the case, without regard particularly to whether the witness is from one company or another, so long as it had application.

Judge Allen: Did you intend to introduce other testimony with reference to the growth and service of other particular companies?

Mr. R. T. Jackson: Well, not along the same line as Mr. Stanley. If it comes in it would be entirely because it had to be mentioned in connection with some other purpose, as I understand it.

Judge Allen: It is things of that sort that the Court feels are cumulative.

Mr. R. T. Jackson: Well, it is something we want to avoid entirely. We had felt, in view of the Court's statement, they would accept it as typical, and with the lack of objection on the other side, that we would not need to make up any particular record, as the Court suggested. But even so we thought that we might be able to stipulate whatever was needed to make a record, if there is anything for the other companies.

And Mr. Fly has kindly offered to cooperate in that respect.

Judge Martin: Mr. Jackson, if we have checked correctly, complainants have already introduced officials of all the complainant companies except the Georgia Power Company and the Kentucky-Tennessee Light & Power Company.

Mr. R. T. Jackson: Yes, sir.

Judge Martin: And what we are seeking to avoid as Judge Allen has explained for the Court, is an accumulation of testimony.

[fol. 221a] Mr. R. T. Jackson: We can well understand that.

Judge Martin: We don't want multifariousness in the hearing, but to give you a fair presentation, an opportunity for a fair presentation of the propositions on which you rely.

Mr. R. T. Jackson: Yes, sir.

Judge Martin: But to avoid an accumulation of testimony that could not be of any benefit either to the trial court here or to the reviewing court, the Supreme Court of the United States.

Mr. R. T. Jackson: We fully appreciate the Court's suggestion, and the reason back of it, and we have lined up our testimony in an attempt to meet that very situation.

When we proved the properties, and that sort of thing with relation to the companies, it seemed to us necessary to make that sort of proof as to each company in order to show what its property was, but we had no intention of going through each of these companies with proof of this character from here on.

We took this as a typical example, and we will have witnesses from other companies, if the Court will permit us, which will touch upon entirely different phases of testimony which we think is material. And if there is any reference to such things as the Court now has in mind it will be because they illuminate the other field of testimony, and not to supplement what is in on that point.

Mr. Fly: May it please the Court I am a little bit concerned about the reference to the Alabama Power Company as typical. I think it is typical of a great number of companies, and possibly of all of them in a number of respects. And I think that the point here is the question of cumulative evidence rather than of taking facts which may differ from company to company, peculiar facts and saying that they are the same throughout the different companies.

Now, such things as the general form of the organization of these companies, and as to the scope of their lines, and their customers, their growth, and the growth in facilities and service and load, the sales promotion activities, and efforts to develop the industry, and in general their efforts towards rural electrification, things that are more or less formal in character, we think are readily subject to stipulation and I believe we can wash out that entire line by taking a few hours and stipulating what could be presented along those lines, rather than in vacuo, suggesting one company is wholly typical.

[fol. 221-b] And then that will bring us down then to special conditions that apply to these companies, when they can get down to problems of line duplication, and contracts of the TVA and that sort of thing.

Mr. R. T. Jackson: That is precisely the way we intended to follow this out, if your Honor please, and we are willing to add, if it is necessary to make a typical case, proof as to different classes of companies,—we will survey that.

Judge Allen: The Court appreciates the cooperation of counsel.

We might say we have considered this problem seriously and asked counsel to take the action requested that is to present a typical small company, because we saw material differences in capitalization and the line of service and territory served, and all that sort of thing, but since the testimony offered by Mr. Stanley was to some extent cumulative of testimony already offered, we desired to indicate that cumulative testimony in the future, with due regard to the rights of every litigant, must be avoided.

Mr. R. T. Jackson: We desire to follow that. And we had thought that the witnesses already on the stand had covered the small companies. It may not be, and we will examine that future and supplement it, if it seems necessary, in the case of a typical company."

HAMMOND GREEN was called as a witness on behalf of the complainants and, having been first duly sworn, was examined and testified as follows:

Direct examination:

I reside in Albertville, Alabama.

I have seen a contract similar to Complainants' Exhibit 193 (excluded) and I have signed such a contract and have it with me. The signature which appears at the bottom of the contract (offered in evidence as Complainants' Exhibit [fol. 222] 197) is my signature. I signed it on August 13 at the request of a committee of the city of Albertville, working on the TVA power plan. After I had signed it, it was turned over to the city, to the mayor, and was produced from a stack of other contracts.

At the present time I am a customer of the Alabama Power Company. The particular contract which I am bringing into court was obtained last night from Mr. Hooper, the mayor of the city of Albertville.

"Mr. Bemis: If the Court please, we offer Complainants' Exhibit No. 197, and reoffer the exhibit which was produced through Mr. Stanley yesterday as Complainants' Exhibit No. 193.

Mr. Fly: We will object, your Honor. I thought I would make the point of my objection on cross examination."

Cross examination:

The name of the man who brought this contract to me and asked me to sign it is at the bottom—H. B. Levy. He operates an oil mill and the electric shop. He is not a member of the City Council. He is just a citizen of the town. He is not an employee of the TVA.

"Mr. Fly: I object to that (Complainants' Exhibit 197) as irrelevant, your Honor, immaterial and incompetent.

Judge Allen: The Court sustains the objection as incompetent, irrelevant and immaterial.

Mr. Bemis: And we may have our exception. That is all, Mr. Green, thank you.

Judge Allen: The same ruling, Mr. Bemis, as to your reoffer of the contingent contract.

Mr. Bemis: Yes, I so understand."

(The witness was excused.)

[fol. 223] JAMES A. LONGLEY was called as a witness on behalf of the complainants and, having been first duly sworn, was examined and testified as follows:

Direct examination:

I am 51 years of age. I live at Chattanooga. I am Vice President and General Manager of The Tennessee Electric Power Company.

The Tennessee Electric Power Company has a field organization in order to get closer to the problems that arise and occur and prevail within the industry. That organization consists of 1,650 employees and it is divided into six districts. Two of these districts are the metropolitan areas in Chattanooga and Nashville. The other four districts are those which serve what we term the state-wide territory, which is made up of the areas outside of Chattanooga and

Nashville, and consists generally of pretty small towns. In the territory we serve there are only five towns that have populations ranging between 5,000 and 10,000 people. The organization that comprises this field organization is departmentalized. By that I mean that there are salesmen, service men, meter men, cashiers, collectors and other people of that kind. Each district is under the direct supervision of the District Manager, who has general supervision and general control over all of the activities that go on in that district. The needs and the problems of the various phases of our business within that district are given the constant study of the District Manager and his organization. The Company also maintains local offices in some of these districts. I think we have forty-five or forty-seven local offices. Each one of these local offices has a number of employes and they operate within the immediate area of that town, in order to give service and to break up the work, so that it all builds down to the point where it gets its roots right into the soil, [fol. 224] so to speak. These local managers are not responsible immediately to the central office. They are responsible to the local office, to the district manager in all cases.

The Company also maintains a central office organization in Chattanooga. This organization is departmentalized in just about the same manner that the district organization is. Actually, the central organization, while it is responsible for the general economic results of the Company, in effect acts as an adjunct to the field organization. There are, I think, about 300 or 310 employes in this central organization, and those figures I am giving are exclusive of the production and transmission department, which is a separate department. It is also exclusive of the transportation systems in Chattanooga and in Nashville. These men that are in this central organization spend a great deal of their time in going through the field, talking over the problems with the district managers and with the field staff, and it is largely from the messages that they bring back, and their knowledge that they learn from these visits that determine the policy of the Company as a whole, which is established here in Chattanooga, the place where our headquarters are.

"Mr. Bemis: Mr. Fly, can we agree that the history of rural electrification in the case of the Tennessee Electric Power Company is substantially similar to the Alabama

Power Company? That would save us the necessity of going into proof on that subject.

Mr. Fly: We will stipulate, your Honor, that in general it represents about the same situation. We, of course, do not stipulate as to particular lines, and particular situations, but over the general scope we will stipulate it is about the same."

Our Company has a rural plan which has been approved by the Railroad and Public Utilities Commission of the State of Tennessee. The gist of that plan is first that for the service that a customer buys, he pays exactly the same price as though he had bought an equivalent amount of kilo-[fol. 225] watt hours as an urban customer. The second feature is that it provides that the customers served by the rural line shall guarantee to pay collectively minimum bills of \$18.00 per month per mile of line. It provides that we are not obligated to serve customers on a rural line where the density is less than 5 customers per mile. These are the essential parts of the plan.

"Q. Mr. Longley, are you able to state the approximate differences between existing rates of your company and those offered generally on the same class of service in Tennessee by or through the Tennessee Valley Authority?

Mr. Fitts: We object to that question.

Judge Allen: The objection is sustained.

Mr. Bemis: Exception, and may the record show that the witness would testify that the Tennessee Valley Authority rates are approximately 31 per cent lower, if applied to the same business of the Tennessee Electric Power Company as a whole. It would also show that the Tennessee Valley Authority rates for residential service are 26.5 per cent lower; its rates for commercial service are 37.5 per cent lower; and its rate for industrial power service is 31.4 per cent lower."

The table (produced by the witness and offered in evidence as Complainants' Exhibit 198) shows the differences between the rates of The Tennessee Electric Power Company and the TVA rates as applied to these various classes of customers assuming loads of typical size, as selected by the Federal Power Commission.

"Mr. Fitts: We do object to it on the ground it is incompetent, irrelevant and immaterial, a comparison of rates.

Judge Allen: The exhibit is excluded upon the same ground as previously made.

Mr. Bemis: And may we have our exception?"

Cross-examination:

The question whether I know what percentage of the farms in the state of Tennessee had electric service on June 1, 1933 is a good deal like asking me how long a road is or [fol. 226] how wide a street is. There are so many definitions for rural organizations, it is almost impossible to answer. I am generally familiar with the Census Bureau definition for farms. Using that definition, I do not know of my own personal knowledge what the percentage of farms is in the state. I have, however, seen some of the figures that have been published. In fact, in the November issue of the Rural Electrification News, there was a table given to show in there that the percentage of farms served was 7.8 per cent, as of a recent date. The figure that I have for June 1, 1933, if it is correct, is 3.6 per cent. I do not have any figure as to the average density of rural lines that were built before 1935. I can not now give you a list of rural lines that have been built by my Company since January 1, 1935, or their average density, but I can have it prepared.

I think it is correct to say that a substantial portion of the service specified as rural service of our Company before 1933, was made from short extensions off of urban systems, or off the lines connecting urban systems. That is, of course, because until you have a number of places where electric service is available, you cannot go into the rural business. Therefore, I think it is a case where you have to have the Christmas tree before you can hang the tinsel.

As I understand the question as to the number of customers previously served by our Company in the rural areas in the Norris area and in the Lincoln County area that are now being served either by the TVA or by co-operatives purchasing power from the TVA, I think there were none. I am quite certain in the Lincoln County area the answer is none. I have the impression there are one or two customers in the Norris area formerly taking our service that now purchase from some source, power now originating from the TVA. I cannot state that as a fact or name any of them.

The Company has not installed any new generating capacity in the last three or four years, although [fol. 227]

we have plans for this new station at Nashville, and the turbine is actually finished and in storage at Schenectady. It has been held up on account of some other matters, so we have not gone ahead with that. We have, however, in the last few years made minor improvements which have added to our capacity. I do not recall off-hand whether we have added about 700 kw. capacity at Selmer, Tennessee, Celina, Tennessee or Jamestown, Tennessee. We have made minor improvements at those places, also at Hales Bar, also at Nashville. The Nashville plant will increase our capacity by 25,000 kw.

I recall appearing before the House Committee on Military Affairs in 1933 and testifying with respect to the development of this river. I do not remember making a specific statement that our Company would not build any dams upon the Tennessee River, and that in my opinion no private company would build any dams upon the Tennessee River. That is a good long while ago to remember it.

"Q. Let me read it to you and see if you recall it then. This appears on page 178 of the Hearings of the Military Affairs Committee of the House of Representatives in 1933 on Muscle Shoals.

'Mr. Hill: Then, you pretty well agree with him that you would not want to build any more dams on the Tennessee River?

Mr. Longley: I said I would not.

Mr. Hill: Then, if you power people won't develop the Tennessee River, and do not feel that you can do it, about the only people who can do it is the Government, is it not?

Mr. Longley: That is true, yes sir.

Mr. Hill: Then, we are left with the proposition that either the Government has to develop the Tennessee River, or it won't be developed at all?

Mr. Longley: Yes, that is true.

Mr. Hill: You think that is true?

Mr. Longley: Yes, sir.'

[fol. 228] Mr. Bemis: If the Court please, we would like to object to that as irrelevant and immaterial.

Mr. Fitts: The only possible objection is, it is beyond the scope of the direct.

Judge Allen: Objection overruled.

Mr. Bemis: Our objection also goes to the fact it is not proper cross and beyond the scope of the direct.

Judge Allen: The Court has already ruled upon that question, and the objection is overruled.

Mr. Bemis: We may have an exception?

Judge Allen: You may have your exception.

By Mr. Fitts: My question is, do you recall that you did give that testimony at that time?

A. Well, obviously when faced with the evidence, I do not think there can be much question of it, Mr. Fitts. I am rather sure I said it."

Redirect examination:

With respect to my reference to some statistics in regard to the number of farms that were electrified in 1933, there were no definitions as to what constituted farms in those statistics, and it depends on the definition you use as to the percentage. I know in one classification where it eliminates all of the farm dwellings of a value of less than \$500, on which basis there is about 17.5 per cent served. In that same connection, I think in the tables that the Edison Institute has prepared, Tennessee ranks 39th; but, when you consider the fact that the average per capita wealth in Tennessee places it as the 39th state, the percentage is not as bad as it appears on the face. On the basis that we used, the definition being all customers outside of the incorporated towns, I have figured that we served as of August 4th, 38,399 rural customers.

Referring to the reports of the Hearings in which my testimony was to the effect that the private utilities did not [fol. 229] want to build any more dams on the Tennessee River, when I made that statement, I had reference to the construction of dams in which the power companies paid the entire cost of construction under the Federal Water Power Act.

(The witness was excused.)

J. L. STREET was called as a witness on behalf of the complainants and, having been first duly sworn, was examined and testified as follows:

Direct examination:

I am 42 years old, reside in Columbus, Mississippi, and have been Division Manager of the Mississippi Power Com-

pany, Columbus Division, for over eleven years. The Columbus Division embraces an area in Northeast Mississippi, comprised of nine counties, Monroe, Chickasaw, Calhoun, Webster, Clay, Lowndes, Oktibbeha, Noxubee and Kemper. As division manager, I have general charge of all activities of the Company in that territory, and am generally familiar with the electric power facilities in that area.

The map (offered and received in evidence as Complainants' Exhibit 199) shows northeast Mississippi, and the electric transmission and distribution facilities located therein. The cross-hatching in the upper righthand corner represents the territory which includes the lines of the Mississippi Power Company which were transferred to the TVA under the contract of January 4, 1934. Prior to the time of that contract, I was district manager in that area as well as the area which now comprises my division. I have seen practically all of the lines which have been constructed either by the TVA or by the rural cooperatives or municipalities from time to time in the course of their construction. The Mississippi Power Company operates approximately 303 miles of transmission lines in the Columbus Division and approximately 330 miles of distribution lines. The green lines in Chickasaw County represent the lines of the Tri-County Power Company, extending out from Houston to Woodland, Manteo and Montpelier; and in Tippah County, in the northern part of the map, represent lines of the Ripley Utility Company, running north from Ripley to the state line into Tennessee above. These are private corporations. The broad lines on the map indicate transmission lines of 50,000 volts and above; the next size, between 15,000 and 50,000 volts; and the smaller lines represent distribution lines of less than 15,000 volts. The broken lines on the map represent lines under construction. I have seen these lines.

The area covered by the Columbus Division, of which I am Division Manager, is essentially agricultural and is composed of a few small communities and about four towns of over 2500 population. We have 62 employees in the Columbus Division, 38 of whom are located in Columbus, and 24 in the local operations throughout the area. The Company is constantly making studies of the territory served by it, and we have made a number of different studies over this entire territory from time to time with ref-

erence to the unattached or potential market of the division.

The unattached industrial power load in the territory is composed chiefly of sawmills, planing mills and other wood-working plants, which use refuse, shavings and other materials of like nature as fuel. They are not considered as potential customers because of the fact that they have their equipment and have this free fuel which they can use. There are four industries in the territory which use steam in the process of manufacturing. In the case of these industries, power can be and is generated more or less as a by-product. They also form a negligible quantity as to potential customers. There are some 30 or 40 cotton gins in the territory, a great many of which are located in rural [fol. 231] areas and have wood as fuel. Some use tractors or other small gasoline engines. The gin business is a load which only operates 2 or 3 months in the year and the extent of the load is dependent upon the crop conditions. The great majority of the industries which I have put in these three classifications are now within reach of the existing Company lines, and we have incidental service to a number of them. For instance, we are serving a portion of the load in all the processing plants. The balance is served by by-product power generated for other purposes. All of these unattached industries to which I have referred have had their own power units for production of mechanical power or electric power for a number of years.

The unattached commercial demand in the territory consists principally of small suburban or rural stores, most of which usually close at dusk, and a small amount of grist mill load scattered throughout the area, which is an intermittent load, generally operated 2 or 3 days a month, and generally using gasoline engines or some other character of power. The unattached domestic demand within reach of the Company's lines is composed chiefly of low rental houses, shacks, Negro cabins and other dwellings of like character. Neither the owners nor the tenants are able or willing to wire for electricity, and are not considered potential customers. There are approximately 2500 of such houses in this district within reach of the distribution lines. That represents approximately $33\frac{1}{3}\%$ of the total houses within reach of the line. In the case of lines in rural areas, the percentage of unserved homes or dwellings within reach of the lines will exceed 50%, approximately 60%.

The character of the unattached domestic demand not now within reach of existing facilities is substantially of the same character as that in the towns and communities [fol. 232] unserved now and within reach of the lines. It is widely scattered and principally composed of very low rental houses, occupied by low income families.

I am familiar with the minimum requirements of the Tennessee Valley Authority Neighborhood Plan, which are approximately 662 kilowatt-hours per mile per month. There is substantially no demand which would meet the requirements of the Tennessee Valley Authority Neighborhood Plan in the area comprising the Columbus Division of the Mississippi Power Company. It is widely scattered and sparsely settled and there are practically no lines of any size or length which would come up to these requirements. All of those distribution lines now distributing TVA power in Chickasaw, Calhoun, Monroe and Lowndes counties, all of which are outside of the area in which the Company's facilities were transferred to the TVA, could be served from the system of the Mississippi Power Company. The system in Monroe County could be served by a substation at the crossing of the Monroe County Association and the Mississippi Power Company line east of Aberdeen. The Okolona system could be served from a substation on the Mississippi Power Company line at Okolona, and the system in Calhoun County could be served by a line extension from Calhoun City north to Pittsboro, possibly six miles.

There are three municipalities in this area comprising my division which have voted to construct their own distribution facilities for the use of TVA power. They are Columbus in Lowndes County, Aberdeen in Monroe County, and Starkeville in Oktibbeha County. We have received communications from those cities complaining as to the Company's rates.

The documents (offered in evidence as Complainants' Exhibit 200) are a file of letters from the City of Columbus to the Company, dated November 24, 1933, July 31, 1937 and November 17, 1937, in connection with the rates charged and sale of the Company's facilities in the city. These [fol. 233] letters are referred to me in the regular routine of business for consideration and comment.

"Mr. Fitts: I would like to finish reading this long letter.

Mr. Bemis: Yes, sir.

Mr. Fitts: To see exactly what is in it. There is no objection.

Judge Allen: What pertinency do you claim for these exhibits?

Mr. Bemis: If the Court please, I think it has pertinency in three or four respects. For one thing it shows that the election to acquire their own distribution system is for the purpose of obtaining the benefit of the rates which have been promulgated by the Tennessee Valley Authority, and not purely because the city otherwise desires to engage in the business of distributing electric power. It shows further the protest of a customer in respect of rates.

Judge Martin: What would be the difference in legal effect in the two situations, Mr. Bemis, the motive of the city, how would it affect the case that we are trying.

Mr. Bemis: Well, I think, if I understand the defendants' position correctly, it is that these municipalities who contract with the Tennessee Valley Authority voluntarily decide to engage in this business. Now, we do not consider that it is voluntary when it is induced by the rate structure which is substantially below the rates at which the complainants can furnish that power.

Mr. Fitts: May it please the Court, may I just state why I did not object to the offer of that letter? It is not on any of the theories,—I don't want to be misunderstood—not on any of the theories that Mr. Bemis has stated, but solely because it occurred to me that if they were offering these letters with some idea that they might be remotely relevant to a showing of injury or damage to the complainant companies, and that alone, without going into any questions as to whether or not the rates were fair or reasonable, or as to what was the inducing cause of a municipality's holding an election, but solely for the purpose of showing an injury to the companies, sufficient to give them a standing in court, it occurred to me that they might be remotely relevant to that issue, and that is the only reason why we did not object.

Judge Allen: The exhibit will not be received in evidence. I might call your attention to a statement by the [fol. 234] Supreme Court, in the opinion which I remember as unanimous, although I haven't the book here. It is a rather pertinent comment: 'The conduct of which the plaintiff complains is not extortion, but on the contrary

charging rates that draw plaintiff's customers away.' That is in the Springfield Gas Case, I think it is 257 U. S. 96.

Mr. Bemis: May we have the record show that our offer is not for the limited purpose mentioned by Mr. Fitts, that we offer this for all purposes, including the purpose of connecting up.

Judge Allen: It is the ruling of the Court that the exhibit is incompetent, irrelevant and immaterial as evidence, and you may have your exception.

Mr. Fitts: That is offered, and I would like to have the record show, in view of the fact his offer is stated as it is stated, we object to the introduction on the grounds stated.

Judge Allen: It is the disposition of the Court to be very liberal in the admission of evidence in this case, which we are sure is competent and relevant and material. It is not the disposition of the Court to pile up immaterial and irrelevant and incompetent evidence in this case, even though it is not objected to by counsel for the Authority.

Mr. Bemis: And we reserve our exception to the Court's ruling."

The documents (offered in evidence as Complainants' Exhibit 201) are a file of the original letters received by the Mississippi Power Company from the city of Aberdeen which came to my attention as District Manager of the Columbus Division.

"Mr. Fitts: We object to this exhibit upon the ground of incompetency, irrelevancy and immateriality, and upon the further ground that there are statements of fact and of reasons given and so forth in here which are pure hearsay, under any view.

Judge Allen: The objection is sustained and you may have your exception.

Mr. Bemis: Yes. Let the record show we reserve our exception."

The document (offered in evidence as Complainants' Exhibit 202) is the original letter received by the Mississippi Power Company from the City of Starkeville which came to my attention as District Manager of the Columbus [fol. 235] Division in which the City of Starkeville is located. Matters respecting the activities in my territory come within my functions and duties in the ordinary course.

"Mr. Fitts: We object to the introduction of this exhibit upon the grounds it is incompetent, irrelevant and immaterial, and further on the ground that it is not sufficiently authenticated, the authority or position of the person writing it is not shown, or that he had any authority to speak for the city.

Judge Allen: The objection is sustained upon the ground that the exhibit is incompetent, irrelevant and immaterial, and for the further reason applying to transactions carried on by municipalities in Mississippi, that is the record shows there is no regulatory commission there, and the city authorities have full power of contract, and the regulation of their own utility operations.

Mr. Bemis: Exception. May I ask just one further question to clear up the point which Mr. Fitts has made the basis of his objection?

Q. Do you know who Joseph S. Rice is?

A. He was the Mayor of Starkeville at that time.

Judge Allen: I didn't get that answer.

The Witness: He was Mayor of Starkeville at the time that letter was written.

Mr. Bemis: I don't understand that the Court's ruling was based upon that question."

The contract (offered in evidence as Complainants' Exhibit 203) is a binder contract to take light and power from the City of Columbus, Mississippi. I am a resident of Columbus, Mississippi. The contract was handed to me in the City Hall by the City Marshal of Columbus, with the request that I sign up for service from the City of Columbus for my residence. I have produced the original which was handed to me. I stated to the Marshal that I would take the matter under advisement and put the contract into my pocket.

"Mr. Fly: May it please the Court, we object to the introduction of this exhibit in evidence upon the ground it is immaterial, irrelevant and incompetent and has no connection shown with the TVA, or with any issues in this [fol. 236] case; and furthermore, that it is clearly an effort to establish the truth of certain inferences from the recitals in this proposed contract, which are clearly hearsay under any rule.

Mr. Bemis: I presume that the Court adheres to the ruling made in the case of other contracts offered?

Judge Allen: The Court adheres to its rulings and the exhibit will be excluded.

Mr. Bemis: And may we have our exception?

Judge Allen: You may.

By Mr. Bemis:

Q. Mr. Street, I hand you what has been marked for identification complainants' exhibit 204, and ask you to state, if you will, what that is?

A. This is a question-aire which was brought to my office by the secretary-treasurer of the City of Columbus, who requested that I supply the information to him for furnishing to the Tennessee Valley Authority in accordance with the request.

Q. And did you assist in the filling out of the blanks of that question-aire?

A. Yes, I secured all the information I could and supplied it to him.

Mr. Fitts: Will you read the preceding question and answer?

(Preceding question and answer read.)

Mr. Fitts: Of course, we move the Court to strike that part of the witness' answer, as to who was calling on him, if it was offered for the purpose of proving that later, as it is hearsay.

Mr. Bemis: Would you agree that this is a copy of the question-aire sent out by the Tennessee Valley Authority to all of the municipalities in this area?

Mr. Fitts: Of course, we cannot agree to it in that form, I know that before I start checking the authenticity of it. I do not know whether it was sent at all.

Mr. Bemis: Such question-aires, I believe, were included in the subpoena.

Mr. Fly: Yes. I will get this straight. I will state this, and we will concede this, because this is a fact that whenever requests or applications were received from municipalities, these blank question-aires were sent out in reply, and in compliance with the request received. They were never sent out except upon such request of the municipality

involved. That is the fact, and that is the fact we are willing to concede.

[fol. 237] Mr. Bemis: Of course, we cannot accept that statement without proof.

Mr. S. D. L. Jackson: We do not know whether they were preceded by a request or not. We do know they were sent out. That statement by Mr. Fitts adds an element on which we have no knowledge, and under the Court's present ruling, we have no way of proving.

Judge Allen: The question immediately before the Court is the motion to strike out the last sentence of the witness' testimony. That motion is sustained upon the ground the statement is purely hearsay.

Mr. Bemis: May we have an exception?

Judge Allen: You may have an exception.

Mr. Bemis: If the Court please, we offer in evidence complainants' exhibit 204.

Mr. Fitts: We object to the exhibit upon the ground it is not shown under what circumstances it was sent out, to whom it was sent out, or the witness has not shown that he knows anything about the question-aire.

Judge Allen: Objection sustained. You may have an exception.

Mr. Bemis: We reserve our exception.

Mr. Bemis: Might I inquire of the Court on what grounds the objection to the last exhibit was sustained, for my own guidance?

Judge Allen: The Court does not consider this admissible evidence. No connection is shown between the Tennessee Valley Authority and this paper. It mentions TVA in the paper, but nothing here to show under what circumstances it was sent out.

Mr. Bemis: We save our exception.

Mr. Fitts: I might say if complainants really want to show the fact here, we will furnish them with all of the applications from all of the municipalities in Mississippi to whom any of these question-aire were sent, if they were sent. We will be glad to do that.

Mr. S. D. L. Jackson: If it please the Court, I might state that is one specific thing mentioned in our subpoena, the question-aire of which this exhibit 204 is a copy, and a list of the people to whom it was sent. We will be very glad to accept this offer at this time to furnish the list of people to whom it was sent.

Mr. Fitts: That was not my offer. My offer is to furnish the applications in response to which this question-aire was sent. My only purpose is to get the facts straight.

[fol. 238] Mr. S. D. L. Jackson: That is our purpose, and if they will give us the list to whom the questionnaire was sent, we will be very glad to accept it."

Cross-examination:

All of the lines that were owned by my Company in the block at the top of the map were conveyed by my Company to the TVA, under the contract of January 4, 1934. That included lines in the counties of Benton, Tippah, Alcorn, Tishomingo, Prentiss, Itawamba, Lee, Pontotoc, and Union. It is not true that the only lines that appear here to be in the territory where my Company has lines, are lines owned and operated by certain municipalities or cooperative associations in the counties of Chickasaw, Monroe and Lowndes. The fact is that the TVA owns a line from Okolona to Amory, a 44,000 volt line. There is also a line from Okolona to Lee County which was transferred by my Company to the TVA. In the area operated in by my Company, the only line operated by the TVA is the 44 kv. line in Monroe County from Okolona to Amory. Rural customers could not be served off of that line. To render that service it would be necessary to build a substation and stepdown the voltage and build other lines.

I can point out on Complainants' Exhibit 199 the exact ownership of each of those lines. The city of Okolona owns the line to Van Fleet, and the lines east from Okolona, the line south down to Gibson and the line west to Buena Vista, down to Carradine. Prior to the creation of the TVA, the city of Okolona owned and operated its own distribution system and generated its own power. It did not purchase power from my Company. The city of Amory owns the line from Amory to Becker. Prior to the creation of the TVA, the city of Amory owned and operated its own distribution system and generated its own power and did not purchase power from my Company. The city of New Albany owns the line from New Albany to Myrtle, and Hickory Flat, Potts Camp, and to Blue Mountain, all this network to Blue Springs and down to Sherman and all of these [fol. 239] rural lines east of Blue Springs. The city of Holly Springs owns the line to Red Banks, Paska, Mount

Pleasant, Michigan City, which is now under construction, and down to Ashland. That is all of the municipally-owned lines, with the exception of a few short lines in the vicinity of Tupelo, which reach out a few miles.

With respect to lines owned and operated by cooperatives, the line in Tishomingo County from Iuka to Tishomingo, Dennis, Belmont to Golden and to the state line, are operated by the Tishomingo County Electric Association. The lines in Alcorn County, radiating north and east to Kendrick, and to the state line; west to Wenasoga; southwest to Kossuth, Biggersville, and Rienzi, and lines from Rienzi down to Thrasher, are operated by the Alcorn County Association. That leaves practically nothing except those main dotted transmission lines.

Our line from Okolona to West Point is a 44,000 volt line. In order to extend service from that line to Buena Vista and Trebloc, and McCandy, in Chickasaw County, we would have to build lines substantially identical with those lines that are shown in red in Chickasaw County, unless those lines were already there. Our line from Okolona to West Point, as it is now constructed, could not be used to serve the territory in the County of Chickasaw that is served by those lines. In order to give any service to those communities in that County, someone would have to build lines of this character shown in red in Chickasaw County. Along our Okolona-West Point line, the line between Prairie and Mulden and Strange is a low-voltage distribution line, of 13,000 volts, which is served from the substation of the 44,000 volt line located at Mulden. The line north from Mulden and Prairie serves the community of Prairie. The line also serves the community of Mulden and serves the rural customers and the community of Strange. That is the kind of [fol. 240] thing we would have to do in order to give service off of any of those 44 kv. lines. The yellow rural lines are from Columbus east to the state line approximately 8 miles, and Columbus northeast some 5 miles, from Columbus to Crawford, Brookville, 25 miles, lines serving Maben and Mathiston and rural customers in this area, in Webster County; a line from Calhoun City to Derma, to Vardaman. That is practically the same kind of line as the line around Birmingham and Guntown and Camp Creek. It is 6600 volts and these are 11,000. There are considerably more low-voltage rural extensions in the area above Chickasaw, Monroe and Calhoun Counties than there are in the area below.

In answer to the question how many of these low-voltage rural extensions in this territory above Chickasaw and Monroe were conveyed by our Company to TVA, the Company conveyed in Tishomingo County the 22,000 volt system from Iuka to Golden, a low-voltage line between Golden and Belmont, and also the line from Paden to Tishomingo. In Alcorn County, the Company conveyed this line east of Corinth for about four or five miles, the line from Corinth to Biggersville, and short extensions in the neighborhood of Biggersville. We had low-voltage lines from Booneville to Wheeler, to Baldwin, to Guntown, to Slatillo, to Tupelo, to Auburn, and a short extension out to Belden, about a mile or two. We had low-voltage lines from Tupelo to Pontotoc, serving the rural customers along that route. We had low-voltage lines from Tupelo, Belden, Shannon, serving the customers in that territory. We had a low-voltage line from Tupelo, north about three or four miles. We had a low-voltage line from Tupelo south to Verona, Shannon and Nettleton, with an extension west of Shannon about a mile or two. We had low-voltage lines from Myrtle to Hickory Flat, Potts Camp, to Blue Mountain. All of that was sold by us to the TVA under the contract of January 4, 1934.

It is my understanding that the line from Pontotoc to [fol. 241] Sardis Dam, going through Lafayette County, is the property of the United States Engineers, built to carry power to be used in the construction of the Sardis Dam. It is a 44,000 volt line. No rural business could be served off of that line without making substantial changes.

The voltage of the line from the state line to Burnsville is 110,000 volts, and the voltage at the present time temporarily from Burnsville to Tupelo is 44,000 volts. However, the line is constructed for 110,000 volts operation. That is what you call a high tension trunk transmission line. You could not serve any customers off of that line without stepping down the voltage and putting in substations and transformers and branch lines. The line from Burnsville to Tupelo through Booneville is a 44,000 volt line. Those two lines are owned by the TVA.

The lines shown on this map which are owned by the TVA, as distinguished from the municipalities, cooperatives and the United States Army, and the voltage of each, are as follows: The 110,000 volt line from the state line to Burnsville, and a 44,000 volt line from Burnsville to Tupelo; the Burnsville-Booneville-Tupelo, 44,000 volt line;

the Burnsville-Iuka-State Line 44,000 volt line; the Burnsville-Corinth 44,000 volt line; the Golden-Fulton 22,000 volt line; the Tupelo-New Albany 44,000 volt line; the Tupelo-Pontotoc 44,000 volt line; the Tupelo-Okolona 44,000 volt line; the Okolona-Amory 44,000 volt line; the New Albany-Ingomar 11,000 volt line, and the Potts Camp-Holly Springs 11,000 volt line. All of the lines shown in red on the map are owned by cooperatives or municipalities who are rendering direct service at retail.

The TVA is not now serving any customers previously served by my Company, either municipalities at wholesale or rural customers direct, within the area claimed by my Company, except customers who are served from facilities that were purchased from us under the contract of January 4, 1934. No municipality or cooperative association which [fol. 242] is purchasing power from the TVA at wholesale is selling power to any customer previously served by us, except customers served from lines conveyed by us under the contract of January 4, 1934. The line of my Company from West Point to Okolona is the line that was used for interchange with the TVA under the contract of January 4, 1934.

The city of Starkville had a city election and voted to acquire and operate its own distribution system. We purchased the plant and distribution system of the city of Starkville from the city. They had previously owned and operated their own system. After we purchased that system, the city had a discussion with some oil manufacturers at one time, before the TVA was created, in regard to going back into the business of owning and operating its own system. I believe they had a lot of lawsuits with our Company. It is not exactly correct to say that when we purchased the system they had previously operated, we got some agreement in the contract or in the conveyance which the courts interpreted as preventing the city from going back into the business. My recollection is there was no agreement in there other than just the purchase of the system from the city. It is a fact that they attempted to go back into the business, before the TVA was in existence, and they are now trying to go back into it again.

I do not know of my personal knowledge whether Starkville, Columbus or Aberdeen has a contract with the TVA for the purchase of power.

I know where the community of Pittsboro is. We had a request for service for Pittsboro from one individual, 8 or 9 years ago, and I do not recall any other requests [fol. 243] since that time. It is now being served by the Pontotoc County Electric Power Association. I would imagine that the Pontotoc Association is serving about 15 or 20 customers there. The Company has not made any survey or study or census of the number of farms in the State of Mississippi not receiving electric service.

Redirect examination:

The Company has made surveys of the entire rural territory, but we have never segregated between any other rural customer and farm service.

(The witness was excused.)

[fol. 244] FRANK B. OSTERMUELLER was called as a witness on behalf of the complainants and, having been first duly sworn, was examined and testified as follows:

Direct examination:

I am 47 years old, reside at Bowling Green, Kentucky, and am in charge of the industrial development of the Kentucky-Tennessee Light & Power Company. In the course of my duties, I am generally familiar with the electric power facilities in that section of the State of Tennessee where the Company operates its distribution and transmission facilities. My duties call me over the entire territory quite frequently. Our business in Tennessee is handled in districts. In the western part of Tennessee, we have what is known as the West Tennessee District and also the Paris District.

The map (offered and received in evidence as Complainants' Exhibit 205) represents or embraces the counties that are included in our West Tennessee and Paris District- in the western portion of the State of Tennessee. In these districts there are about 150 miles of 33kv. line, and about 50 miles of low voltage, 13,200 and 11,000 voltage lines. Of course, the yellow lines on the map do not show all of the distribution lines as they do not indicate the distribution within the city limits of the towns that we serve in that

territory. The lines in red represent those lines in the territory referred to that are supplying TVA power to the people in that community. All of those lines are owned and operated by the Gibson County Electric Membership Corporation. The map shows a heavy purple line from Jackson to Milan and a dotted line from Milan to Trenton, which are owned by TVA. The lines in red and purple were constructed by the TVA, that is by men and workmen who were using TVA equipment that had TVA licenses. All of the lines have been built since 1935, when I assumed [fol. 245] the responsibility for that particular territory, and my trips were frequent enough for me to see those lines in all stages of completion. The lines in green represent those owned by other utility companies from whom we purchase electricity, or to whom we sell electricity for distribution in this territory. I have reference to an interchange or connection at Fulton. That line belongs to the Kentucky Utilities, and we purchase from them at that point. The green lines from Huntingdon east are lines representing property of the Tennessee Electric Light & Power Company to whom we sell current at the Huntingdon station.

The seven counties shown on this map in the West Tennessee and Paris Districts run from the Mississippi River on the west over toward the Tennessee River on the east. Along the Mississippi River, the territory is mostly of a low land nature, the entire section being agricultural and mostly rural. Along the river in the low lands the principal crop is cotton, and farmed to a great extent by tenant farmers. As we go toward the east, the territory runs into the rolling low hilly country. There are no large cities in the territory at all, the cities of Paris and Dyersburg, each with a population of about 8,000, being the largest. Union City has about 6,000 population and there are a group of cities—Martin, Humboldt, Milan, McKenzie, cities of that nature,—which have 1,000 to 5,000 population. In that entire section of the country there is about 20% negro population.

The organizations that make up the Paris and West Tennessee Districts of the Kentucky-Tennessee Light & Power Company comprise about 35 men. Those organizations are made up of superintendents in practically all of the towns we serve, whose duty it is, in addition to taking care of the mechanical end of the business, to also be on the lookout

for expansion of business. Their reports are turned in to the District Office and checked up by men out of Bowling [fol. 246] Green, whose duty it is to call on these districts regularly, and review and make recommendations on such expansions as seem feasible or possible.

Although we have never made a general unit study of the untouched or potential business in this area or a study of the territory at one time, these men in the field have regularly made studies of their own immediate territory to find out the possibilities. There is an exceptionally small amount of untouched industrial power load in the territory. In Lake County, in Tiptonville, there is a small cotton mill which at the present time uses steam for generating power. It is on our line and we are serving it electricity for smaller uses.

In the territory we have four ice plants which, at the present time, use steam as a means of operating their plants. They are located in various sections of the territory and are also served by our Company lines, but they are small users. There are various flour mills, railroad shops and hamper mills. Those hamper mills use refuse lumber for fuel, which practically eliminates their use of our service. About 75% of them use a small amount of current from us at the present time. The only other industrial load that we may class as such is highly seasonal business, by which I refer to cotton gins which are spread all through the communities in this section, and which is primarily a small business. In most of those cases we have connections serving light to them while they are operating. I would say 75% of those gins buy lights from us. All of these industries to which I am referring use steam and that equipment would have to be replaced before we could sell them energy for their entire use.

There is no untouched commercial load in this area to speak of. The only thing that I could mention in that connection would possibly be crossroad garages, stores, things of that nature, which are few and far between.

[fol. 247] With respect to the untouched domestic demand in this territory within reach of our existing lines, there are approximately 2,000 houses that are not using our service at the present time, even though they are within reasonable distance of existing lines. Most of these homes are small, two and three room cottages, quite a few tenant

shacks out on cotton plantations. In fact, it is a very poor class of people who are not using our service now. In that section we have in round figures about 6,000 customers, and about 2,000 that are not availing themselves of the service. Depending on how you figure, that would either be 25% or 33⅓%. In the rural area, our percentage runs about fifty-fifty, meaning for each customer that we serve there is one that is not availing themselves of that benefit, and in the towns that would run about 75% to 25%—about 75% using current and 25% not.

With respect to unattached houses in this area which are not within reach of any existing distribution lines, there are three counties in the eastern portion of this block that are not receiving TVA power of any kind. We operate in the greater portion of each of these counties, and the existing untouched business in that section is pretty much along the lines of what I have described in this other section. In fact, I doubt whether there is enough business to justify the erection of transmission lines to bring current into that section. In Henry County, which is the northeast portion of the block, we operate in the City of Paris, which has something over 8,000 population. About two years ago the City of Paris had an election authorizing bonds for the purchase or erection of their own distribution system. Within the last thirty days the Administration of the City of Paris has signed a contract with the TVA for service in that community. I understand a 44,000 line will extend from Milan to Paris and serve this business when ready to take service. [fol. 248] If they build that transmission line up in that section, naturally they will be able to place substations under the line and take care of some of the business in that section. But as a whole, I would say the domestic business in that section is not very much. It is pretty scattered, because that is a rolling country up through there. I would say it is not any better than the unattached domestic business which is within reach of existing Company lines, but which does not avail itself of service.

I am familiar with the minimum requirements of the Tennessee Valley Rural Cooperative or Neighborhood Plan—662 kilowatt hours per mile per month on lines constructed. From the surveys we have made from time to time there is substantially no unattached domestic business in this territory that could be served under the 662 kilowatt hour requirement.

A good portion of the lines shown in red on this map, Complainants' Exhibit 205, representing the lines owned and served by the Gibson County Cooperative Membership Association, are so located that they could be served from our substations in that particular locality. Of course, there would be a small amount of work necessary, a little line extension, or possibly an increase in some transformer capacity. It would not be a big job to take care of the lines in our territory, as our lines have sufficient carrying capacity. I mean by that that our lines have sufficient unused capacity, so that assuming that we did have the generating capacity we could serve this system of lines from our existing transmission system. In addition to the town of Paris, the town of Newbern in Dyer County in this district had an election last month which authorized a bond issue for the purchase or construction of a municipal system to use TVA power. There are some other towns in the area now being served by the Kentucky-Tennessee Light & Power Company which have voted in favor of acquiring a distribution system to use TVA power, but they are outside of [fol. 249] this district. One of them is Clarksville in Montgomery County, and the other is Gallatin in Sumner County.

Cross-examination:

The smaller lines in red on Complainants' Exhibit 205 indicate the lines owned by the Gibson County Electric Membership Corporation. Outside of the cities such as Trenton and Milan, there are approximately 1,000 customers served by the lines of the Gibson County Corporation. None of those customers were previously served by my Company.

There are quite a number of towns and cities in the claimed territory of my Company shown on Complainants' Exhibit 205 which own and operate their municipal distribution systems. Union City in Obion County, with a population of around 6,000 people, has its own distribution system, generating its own power. In Dyer County, the City of Dyersburg, with somewhat better than 8,000 population, has its own distribution system and generates its own power. The City of Dyersburg does not happen to be shown on this map, but it is about ten miles southwest of Newbern. In Gibson County, Trenton owns its own distribution system. It was and probably still is generating

its own, or some of its own, power, but has a contract for TVA power. The City of Milan had its own generating and distribution system but is now using TVA power. All of these cities owned and operated their own distribution systems and generated their own power and did not purchase power from my Company before TVA.

The City of Paris still owns its own distribution system. We merely have it leased from them. The lease arrangement was entered into eight or nine years ago. I couldn't answer the question whether subsequent to that leasing agreement the City of Paris made any effort to draw out of the arrangement and operate its own system as I have not been up in that territory that long, but since I have [fol.250] been up there, there has been no such effort. I have been in that section a little over two years. I do not know specifically whether a lawsuit was filed by the City of Paris previous to 1933 to draw out of this leasing arrangement. I know there have been lawsuits, but I don't know what they were all about.

Examination by the Court:

There is a lawsuit pending in the eastern division of the western district of Tennessee, Kentucky-Tennessee Light & Power Co. against the City of Paris, which has been set for trial December 27, 28 and 29, 1937. That case is a case against the PWA grant or loan in connection with the City of Paris.

Cross-examination continued:

I really don't know what our surplus generating capacity is. I know that we have generating power at Mayfield, and we also have an interchange, or purchase contract with the Kentucky Utilities at Fulton. That is all I know about it. I am generally familiar with the Company's sources of power supply, but I am not familiar with any plans it might have to obtain an additional power supply in the future. I have never heard any discussion between, or had any discussion with other officers or employees of my Company with regard to a possible purchase of power from TVA. I am not an officer and I have had no discussion with anyone on that subject. I don't have any figures as to the amounts of sales

in Tennessee in kilowatt hours in recent years since I came to this area. Without giving any detail, I could state that the kilowatt hour sales of the Company have increased as years have gone by. I think it is correct to state that 1936 was the high point for the Company of kilowatt hour sales.

In answer to the question whether Complainants' Exhibit 74, a map of the territory of the West Tennessee Power & Light Company, does not include Gibson and Dyer Counties [fol. 251] and the territory in which are located the towns of Milan, Gibson, Trenton, Dyer and Obion and which are also shown on Complainants' Exhibit 205 as territory claimed by our Company, you will note from our map that the yellow lines representing our distribution system only covers a portion of those Counties. We operate only in the northern half of these three lower Counties.

When speaking of the amount of load within reach of my Company's lines, I regard within reasonable reach as being within anywhere up to 500 feet. In answer to the question whether I would describe the southern and central portions of Gibson County as within reach of our Company's lines, I would not even call that our territory, because that is served by these other communities and the other utilities.

In order to serve the lines of the Gibson County Corporation with the existing lines in our territory, we would have to take the same minor steps that we do to our own distribution. We would have to step it down from 33 kv. to whatever voltage was necessary as we are doing at the present time for our own service in our substations at different points in that territory. We would not have to construct a substation, as we have substations at various points at the present time. It happens that these lines of the Gibson County Electric Membership Corporation are practically up against the towns in which we have substations, so that it would merely mean a matter of connection. Troy, where the lines of the Gibson County Corporation practically encircle the City, is one of such instances.

The red lines on Complainants' Exhibit 205 which represent the lines of the Gibson County Corporation run through the Town of Obion, but not through Troy or any other town. There would have to be a connection made at Troy between our substation and the lines of the Gibson County Corporation, and that connection would be in the form of an additional line which would have to be con-

[fol. 252] structured. I understand that the lines belonging to the TVA between Jackson and Milan and the proposed line or line under construction between Milan and Trenton, are 44 kv. transmission lines. The rural lines that our Company has in this section are mostly small lines running out of the towns in which we operate, and in most cases they would be too small to show on this map, Complainants' Exhibit 205. There are a few that can be seen, coming out of Martin, for instance. We have a total of 71 miles of rural line, most of it in small stretches outside of the cities. I have no knowledge with respect to the Brown Shoe Company near Union City. In answer to the question whether there are any large industrial customers in Clarksville, Tennessee, that we are not now serving, I think we have that territory pretty well covered. We serve such concerns there as the American Tobacco Company and the Dunlap Milling Company.

Aside from the contract between TVA and the City of Paris, I do not know of the existence of any contract between TVA and any other city or town in my territory.

I am not familiar with the capital structure of my Company and do not know whether any of its securities are outstanding in the hands of the public.

Redirect examination:

Clarksville is about 65 miles east of the City of Paris, and it is located in Montgomery County. It is not in the West Tennessee or Paris Districts of the Kentucky-Tennessee Light & Power Company. It was clear to me in my direct testimony about the extent and character of the unattached industrial demand that I was referring to the territory described as the West Tennessee and Paris Districts, and my testimony had reference to those two districts, and the same is true in reference to my testimony as to the unattached commercial and domestic demand.

(The witness was excused.)

[fol. 253] CHARLES A. COLLIER was called as a witness on behalf of the complainants and, having been first duly sworn, was examined and testified as follows:

Direct examination:

I am 49 years old, reside in Atlanta, Georgia, and am Vice President of the Georgia Power Company.

"Mr. Fitts: May it please the Court, I would like to inquire before we waste any more time with this witness, whether or not it is the purpose of the complainants to attempt to elicit from this witness testimony as to the situations in the state of Georgia, as to the territory or claimed territory of the Georgia Power Company? If it is, I think any such testimony is clearly inadmissible in this case. The Georgia Power Company has been enjoined by the District Court in Georgia, which injunction has been affirmed by the Circuit Court of Appeals for the Fifth Circuit from further proceeding in this case, since they already have a case pending in the District Court in Georgia, which fully covers the situation, that was pending at the time this case was filed.

Under those circumstances the Georgia Power Company clearly cannot seek any relief, or produce testimony on its behalf.

In event the purpose is that the other complainants are going to prove what has happened or may happen in the state of Georgia to justify relief in their behalf, although neither of the complainants has a legal interest in what has happened or may happen in the state of Georgia, and no legal right to protest about the same, and whatever happened there is completely outside of the scope of the issues in this case.

Mr. Bemis: If the Court please, this witness is not called to testify in behalf of the Georgia Power Company.

Judge Allen: If you are a resident of the state of Kentucky, or Tennessee, are you in position to question on behalf of the state of Georgia that the state rights of the State of Georgia are being violated?

Mr. Bemis: Well, I think we have a right to consider anything on the question of whether or not the defendants have exceeded the constitutional powers which have been delegated to them by the Federal Government.

[fol. 254] Judge Allen: Just what do you expect to show?

Mr. Bemis: We expect to show what lines have been constructed, what operations have been conducted in the state of Georgia. We would like also to show what business, unattached business there is in the area, because one of the things which we are undertaking to show with respect to all of the area which is within the radius of the Tennessee Valley Authority distribution and transmission system is, the amount of power which can be produced and used. To

do that, we will show the reasonableness of apprehension by the other complainants, as to the sale of power to their own consumers.

Judge Allen: The specific question on which the Court would like to be enlightened on is, how a threat to the Georgia Power Company in Georgia is a threat to you, in Kentucky, Tennessee, Alabama, and so forth? That is the specific question."

(At a subsequent session of the Court the admissibility of the testimony of the witness Collier was argued orally by counsel for complainants and the scope and purpose of the testimony was further explained:)

"Mr. R. T. Jackson: The scope of the testimony which we propose to elicit from Mr. Collier is limited generally to showing the extent of unattached load within the area within reasonable transmission distance of Tennessee Valley Authority dams, generating plants, or other power pool; second, the extent of the attached demand within that same territory; and third, the extent of that part of this unitary single Federal utility of the Tennessee Valley Authority which lies within the state of Georgia. Those are the limits of the testimony in a general way.

The purposes for which we offer this testimony are primarily these: First, on the issue that the plaintiffs are inevitably and necessarily threatened with irreparable damage by the consummation of this plan for a vast Federal electric utility in this area; that such a utility may not be carried to completion as it is now in progress of construction, and the output marketed without displacing in whole or in part the business of these plaintiffs.

The second purpose is to show that this vast Federal utility is of such size that as a necessary result it invades the reserved powers of the states, and the people as it is said in the Ashwander case that the Federal Government may not do under the power to dispose of property.

.

Judge Allen: The Court has considered this matter since Friday. It has had the benefit of two briefs on behalf of [fol. 255] half of complainants during that time, one of course, being on the general aspect of the case, but then of some pertinence, at least counsel for the complainants cer-

tainly hope they do, and the Court also think they do. The ruling of the Court is that it will not receive the testimony of the witness Charles A. Collier. The Georgia Power Company is not a party to this hearing and cannot pray for any relief here. The other complainants have not such an interest that they can pray for relief on behalf of the Georgia Power Company, nor that they can seek relief for themselves predicated upon alleged injury to the Georgia Power Company. If the testimony of this witness is to be received, testimony as to damages to other power companies within the 250 mile radius of any of these dams in Kentucky, Arkansas and so forth, should likewise be received, whether or not such companies are parties to the suit. This would result in interminable delay and in the reception of a vast mass of incompetent, irrelevant and immaterial evidence.

This ruling applies not only to the testimony of the witness Collier, but also as to the other operations of the Tennessee Valley Authority in Georgia. You may have your exception.

Mr. R. T. Jackson: And may I make the record clear, may we also have the record show at this point that this evidence is not proffered for the purpose of seeking any relief whatsoever, or any injunction against the operations of the Tennessee Valley Authority in Georgia, anything of that character, but solely upon the grounds, or at least on the question of whether this unified power plan is constitutional.

Judge Allen: You may have your exception.

Mr. R. T. Jackson: And I presume we can make our offer of proof.

Judge Allen: We suggest that counsel dictate to some stenographer what this witness would testify, then the Court will have a clear knowledge of what the witness will show.

Mr. Bemis: I presume the Court would like to have that done then outside of the time the Court is in session, that you would prefer I do that later rather than at this point.

Judge Allen: Yes, let it go in at this point.

Mr. R. T. Jackson: We will have to work pretty hard to work day and night and then dictate our offers to prove.

[fol. 256] Judge Allen: The Court is concerned in not having the record covered with verbatim testimony of the witnesses, when it is not necessary in order to preserve your exception.

Mr. R. T. Jackson: May we have an exception to the ruling of the Court?

Judge Allen: You may. The Court is proceeding now under the Equity rules."

[fol. 257] (At a subsequent session Counsel for complainants submitted the written statement of an offer to prove with respect to the excluded testimony of Mr. Collier and the following occurred:)

"Judge Allen: This was not exactly what the Court meant as to length, Mr. Bemis. Will you let us look it over, please?

Mr. Bemis: Yes.

Judge Allen: Proceed.

Mr. Bemis: The general nature of the testimony expected from the witness Collier, having been generally stated and discussed, and the Court having ruled that none of it should be received, and the complainants' having reserved an exception to the ruling, now present the following statement of the testimony which the witness would give if permitted.

1. The map—

Judge Allen: The Court does not, as it has indicated, the Court does not look with favor upon reading into the record long offers to prove. Under Equity Rule 46 the requirement is that a clear statement shall be given of the nature and character of the testimony relied upon. The Court cannot at this time remake, rewrite the more than three closely written, closely typewritten pages that have been offered here. The Court will do that later.

Mr. Bemis: Well, if the Court please—

Judge Allen: It is our view, stated distinctly, that as in an accident case, if you offer a witness to testify that he saw the accident, and that such and such a thing happened, you don't in your offer to prove give verbatim or in detail the testimony of the witness. You say the witness if permitted to testify would state that he was present at the scene of the accident, and that he saw the automobile strike the woman. Isn't that so?

Mr. Bemis: Yes, if the Court please, but there are a number of exhibits here.

Judge Allen: Yes.

Mr. Bemis: Which are in connection with the offer.

Judge Allen: This Court will consider this offer and will reframe it in accordance with Equity Rule 46, and in the

future the Court will ask counsel on other offers to prove, to make the offer very succinctly in accordance with Equity Rule 46, and we will proceed with the case. Perhaps the Court has not made it plain. It is our deliberate and unanimous opinion to confine this case within practicable limits. [fol. 258] Mr. Bemis: Well, we may have an exception, if the Court please. Now, we have endeavored to confine our offer to prove to as condensed—

Judge Allen: Let's proceed with the case. Another point that the Court would like to make plain to counsel, with great friendliness, is that when the Court has ruled against counsel, we hope to go on with the case. You have your exception, and we shall proceed with the case.

Mr. Bemis: Well, may I do this, if the Court please? The Court has taken, as I understand it, for further consideration, the offer to prove, which is submitted in writing.

Now, that offer to prove has reference to certain exhibits which we wish to make a part of the offer to prove, and for the Court's information I would like to have the Court see what those exhibits are because otherwise the offer which has been submitted would not be self-explanatory.

Judge Allen: All right."

(At a subsequent session, after the Court had examined the written offer of proof, submitted by complainants, of the witness Collier's testimony, the following occurred:)

"Judge Allen: The Court at this time will rule upon the question of the testimony of the witness Collier, which has heretofore been excluded:

Referring to Equity Rule 46, reading a part of it:

'Where evidence is offered and excluded and the party against whom the ruling is made excepts thereto at the time, the Court shall take and report so much thereof, or make such statement respecting it as will clearly show the character of the evidence, the form in which it was offered, the objections made and the rulings and exceptions.'

Now the objections and rulings are no part of the controversy here. The Court requested counsel to make such succinct offer as possible. The Court has examined the offer of proof with reference to the testimony of the witness Collier. That testimony relates to two maps and a table. The Court has struck out of the offer of proof the

description of the maps, because the maps and legends carried therein their own description. The Court will now read that part of the offer of proof which it considers clearly shows the character of evidence, in the form in which it was offered. The form in which it was offered has already appeared in the record.

The Witness Collier, if permitted to testify would state [fol. 259] that the map shown to him and marked for identification complainants' exhibit 329 accurately represents the territory in northwest Georgia known as the Dalton Division of the Georgia Power Company; and the transmission and distribution lines of the Georgia Power Company therein.

The witness if permitted to testify, would further testify that: The map shown to him and marked for identification complainants' exhibit 330, is a map of the State of Georgia showing the transmission and distribution system of the Georgia Power Company and the municipalities in which the Georgia Power Company owns and operates distribution systems.

The witness would further testify that the Georgia Power Company has studied the unattached and potential business in the territory served by it, and that there is no substantial unattached industrial electric power business in the State of Georgia; and no substantial unattached domestic or commercial demand which could be served under the stated minimum requirement of the Tennessee Valley Authority's rural electrification or neighborhood plan, beyond the easy reach of existing company distribution facilities.

The witness would further testify that the tabulation shown him, and which is marked for identification complainants' exhibit 331 accurately shows the Georgia Power Company's number of customers and total kilowatt hour sales within the respective zones referred to therein for the years stated thereon respectively, the figures being taken correctly from the books and records of the company.

The witness would further testify, if permitted to testify, that he has read the testimony of David E. Lilienthal, as found on pages 476 to 483, inclusive, of complainants' exhibit 116, and the table appearing on page 483 of complainants' exhibit 116 which specifies 13 prospective customers to be served by this proposed TVA system; the first 12 are now receiving all of their power requirements from the Georgia Power Company under written contracts, which

have from one to ten years yet to run; the Cave Springs Paper Mill at Cave Springs, Georgia, has been interested by the Georgia Power Company in constructing a plant at that location.

Mr. R. T. Jackson: If your Honor please, we do not want to make any unnecessary objection. May we have the privilege of checking this statement with ours, to see if anything material is omitted and not interpose an objection unless we do?

Judge Allen: You may."

[fol. 260] (Thereafter Counsel for the complainants submitted to the Court the following request for the amplification of the offer to prove as revised by the Court respecting the excluded testimony of the witness Collier):

"It is respectfully suggested that although the offer to prove dictated by the Court in connection with Mr. Collier's testimony is in the main a succinct statement of what Mr. Collier would have testified if he had been permitted to do so, there is, however, certain material information in connection with Complainants' map exhibits 329 and 330, which does not appear on the legends on those exhibits. It is therefore suggested that in order to make the offer to prove complete, the following changes should be made:

1. The first paragraph should be changed to read: 'The witness Collier, if permitted to testify, would state that the map shown to him and marked for identification Complainants' Exhibit 329, accurately represents the territory in Northwest Georgia known as the Dalton Division of the Georgia Power Company, and the transmission and distribution lines therein; that the lines of the North Georgia Electric Membership Corporation shown thereon were constructed by the Tennessee Valley Authority and are now distributing TVA electric energy; and that the lines in green thereon are mainly lines of the Tennessee Electric Power Company.'

2. The second paragraph should end with a semi-colon rather than a period, and the following additional phrases added thereto: 'that the arcs shown thereon are drawn from Chickamauga, Guntersville and Hiwassee Dams as centers; and that the red lines in the northwest corner thereof are proposed TVA transmission lines as shown in the testimony

of David E. Lilienthal on pages 476-483 of Complainants' Exhibit 116.'

3. It is further suggested that the record should indicate that these Exhibits 329, 330 and 331 were excluded and that Complainants excepted to their exclusion."

(At a subsequent session, the Court made the following ruling with reference to the foregoing request:)

"Judge Allen: The Court wishes to take up one or two preliminary matters. The offer to prove made by complainants in connection with Mr. Collier's testimony may be amended as requested by complainants. Let the record show that complainants' exhibits 329, 330 and 331 are excluded and the complainants have excepted to their exclusion. These exhibits are rejected because on their face they show they relate mainly to operations of the Georgia Power Company, which has been enjoined from seeking relief in this case. Let the record also show that maps of the State of Georgia which show operations other than the Georgia Power Company will be received in evidence if otherwise competent, relevant and material."

[fol 261] D. R. BONNER was called as a witness on behalf of the complainants, and having been first duly sworn was examined and testified as follows:

Direct examination:

I am 35 years old, reside in Harriman, Tennessee, and have been District Manager for the North Tennessee Division of The Tennessee Electric Power Company since July 1, 1935. Prior to that time, I was Local Manager for the Company at Clinton, Tennessee, which is in the same district.

The North Tennessee District is comprised of 16 counties and parts of 4 other counties, extending from near the Kentucky line at Jellico and southwestward to the Tennessee River near Kingston, Tennessee, thence northwestward to the Kentucky line near Westmoreland, Tennessee. From my knowledge of that territory as District Manager, I am familiar with the distribution electric power facilities in the district.

The map (offered and received in evidence as Complainants' Exhibit 206) shows the territory which comprises the North Tennessee District, and the distribution lines and transmission lines located in that district including the transmission and distribution system of The Tennessee Electric Power Company in this area. However, it does not show the entire distribution system of the Company. It does not show a lot of the lateral rural lines, and the distribution systems within the towns which it would be impossible to show on this small a map. The red lines represent lines that were built within this area to distribute TVA power. Practically all of those lines were built since 1935, and they were built by crews using TVA trucks with TVA licenses and, in some instances, the men were wearing TVA identification buttons. The broad purple line represents the transmission line of the TVA from Wilson Dam to Norris Dam. That line was not, as [fol. 262] I understand it, constructed by men using TVA equipment. I have heard that it was constructed by a contractor. The other purple lines in and around Andersonville are the TVA distribution system, and that was built by TVA men. Both the lines shown in red and the lines shown in purple are lines which either transmit or distribute TVA power.

The Tennessee Electric Power Company has in this area approximately 72 miles of 66 kv. line and approximately 27 miles of 44 kv. line. They have under construction at the present time from Sparta to Cookeville a 44 kv. line, which will be underbuilt with a 6900 volt line for serving the rural area along that line. I believe that the total amount of distribution lines in that area is 919 miles of which, leaving out the distribution lines within the incorporated towns, 719 miles are rural lines of 11,000 volts and below. Of course, some of those are transmission lines between communities. Those lines that are colored in green on the map are lines that are owned by someone else other than The Tennessee Electric Power Company, and that are not distributing TVA power.

The lines in the upper lefthand corner of the map are lines that are now under construction by the Tri-County Electric Membership Corporation; and these lines in the eastern section serving Woolridge, I believe, belong to the Kentucky Utilities.

In the northern and eastern section, the geographical character of the territory in my district is very mountainous. I would say that extends from the extreme eastern portion over across the Cumberland Plateau to around and near Cookeville and Sparta, and in that area is located practically all of our industrial consumers. Our industries are made up of textiles, paper manufacturing, plow manufacturing plants located principally around the larger towns of Rockwood, Harriman and Clinton. Then, [fol. 263] up in the eastern section we have our coal mines, large coal mines which are located around Coal Creek in the LaFollette area and around Petros. The balance of that area is very mountainous and has scattered and small communities. The western section of the district is made up primarily of agriculture and, in fact, that section is given over largely to the growing of tobacco in and around Carthage and in the valley of the Cumberland River. The extreme northern section is made up of rolling territory and is still given over to agriculture around Celina and Livingston.

I would say the principal load centers are around Rockwood, Harriman and Clinton. Harriman is a town of around 8,000; Rockwood, rather close to 5,000; Clinton about 3,500. Those are not census figures, but what we consider to be about the size of those towns.

The Company is continually making studies of the potential unattached business in the area. That work is carried on by our 9 local offices in the district under the supervision of the Local Manager. In fact, all of our employees are gathering various information at all times and carry that to the Local Manager, who, in turn, makes a study of it. We have 145 field employees in the district.

From the studies I have made I would describe the character and extent of the unattached industrial business in this area as follows: There are 10 unattached industrial customers that use process steam in their manufacture, and therefore generate their own power. However, 7 of these do take a small amount of power from The Tennessee Electric Power Company, and all of them are along existing Company lines. In addition to that, there is another group of 13, which do not use steam processing. They are made up, I would say, of 3 groups, coal mines, clay manufacturing [fol. 264] plants and large saw mills. In the case of coal mines, there are 7 unattached, 2 of which are along

existing Company lines, and one of those is receiving about 50 per cent of its demand from the Company. The others are not along existing Company lines, but in widely scattered territory. Then, we have one clay manufacturing plant which is not on existing Company lines and has been operating intermittently for the last several years. In addition to that, I believe we have 5 saw mills and planing mills which are located in this area. There are 5 of these planing and saw mills and 4 of them are within reach of our existing facilities. Two of them are taking a small amount of power, and all of them have a great amount of refuse which they use to generate their power. All the unattached industrial consumers in this territory have existing plants which it would be necessary for them to scrap or abandon in order to take power from any central station system. I have now described all of the unattached industrial business in this area.

Referring to the extent of the unattached commercial business in my district, which is a very mountainous territory and with widely scattered population, it is made up of just a few scattered country stores and filling stations, non-electric commercial consumers. Of course, in that group is a limited number of small saw mills, grist mills, which operate intermittently and move from place to place.

The unattached domestic demand within reach of the present lines in this district is made up primarily of people in the lower income group and tenants. In the majority of cases, they are not able to take electric service, not able to pay for it, and in lots of instances, they have not even been able to wire their homes. I had a survey made of the unattached houses within reach of existing Company lines, and we did not consider them within reach unless they were within 1,000 feet of a line. Outside of the incorporated towns there were approximately 4,100 unattached homes [fol. 265] within reach of existing Company lines in the area. That represents about 45 per cent of the total business that might be available.

The unattached domestic demand in the district, which is not at the present time within reach of existing distribution lines, is made up of greatly scattered rural dwellings throughout the district and, in the majority of cases, I would say that they are even less able to take power than those that are unattached along the present existing lines. They are made up of scattered, in lots of cases, mountain people,

people of the lower income groups, and in the agricultural sections, some tenants.

I am familiar with the TVA Rural Cooperative or Neighborhood Plan for line construction of 662 kwh. per mile of line per month, and I am familiar with the regulations of the Railroad and Public Utilities Commission in Tennessee affecting rural extensions on the part of The Tennessee Electric Power Company. We made a study of the extent of the unattached domestic demand that could be served within the minimum requirements of the TVA's so-called Neighborhood Plan or under the minimum requirements of The Tennessee Electric Power Company Rural Electrification Plan and, in my opinion, there are approximately 11 projects that might be servable under either of those plans. They are widely scattered throughout the entire district and represent about 60 miles of line. Those extensions to which I refer are not, in the majority of cases, within access or reach of the TVA power in this area. In other words, I would think that it would be necessary to extend the transmission facilities of the TVA to be able to serve all of those extensions.

The distribution lines which have been constructed and are now being served by the TVA in this area could be [fol. 266] served from the power facilities of The Tennessee Electric Power Company. The distribution lines in the Clinton area, Norris Dam and Anderson County, could be served from the distribution system of the Company at Clinton. The lines in Rhea County and Cumberland County of the Meigs County Cooperative could be served either from the Company's distribution system at Crossville or its distribution system at Spring City. In fact, I think we would serve them at both points.

By noticing the map, Complainants' Exhibit 206, you will see that the facilities of the TVA in this district have been extended adjacent to the lines of the Power Company, and therefore, have taken away the potential market for the extension of our lines in that territory. If we were to interconnect our system or extend our distribution lines out to the more remote rural sections, it would be necessary for us, in lots of cases, to parallel the lines distributing TVA power. And for that reason their lines being constructed in those territories do represent an economic block.

"Q. Mr. Bonner, I show you what has been previously offered in evidence as complainants' exhibit 187 and ask you to state whether or not that circular was distributed generally in your territory in the state of Tennessee?

A. Yes, it was.

Mr. Fly: We object to that as irrelevant, your Honor.

Judge Allen: The objection is overruled for the present. Find out how he knows of it.

Mr. Fly: That, if your Honor please, is the excluded exhibit.

Q. Mr. Bonner, do you have any knowledge as to the distribution of the pamphlet which I have just shown you?

A. Yes.

Q. Have you seen this pamphlet in the hands of any of your customers?

A. Yes, we had—I was local manager—

[fol. 267] Judge Allen: Did you see anyone distribute that pamphlet?

The Witness: No ma'am. I received mine through the mail.

Judge Allen: The Court sustains the objection. You may have your exception. There is no direct connection shown between the Authority and the distribution of this pamphlet, and for the time being, the Court will ask that insofar as counsel may, when an objection and exception are made with reference to the same kind of testimony or the same testimony or the same evidence that has already been excluded,—the Court will ask counsel to proceed, because the grounds of the objection and the exception and ruling already appear in the record.

Mr. Bemis: Yes, if the Court please, and I do not intend to duplicate that portion, but there had been no evidence as to its distribution in Tennessee. That was the purpose in this instance.

Judge Allen: You may proceed. The court is endeavoring to help both litigants by excluding cumulative, purely cumulative testimony in this case. We are trying to help both litigants by doing that. So, when the point has been definitely made and definitely ruled on by the Court, and falls definitely within the same legal ruling, it is not necessary to discuss it.

Mr. Bemis: And we may have our exception?

Judge Allen: You may have your exception.

Mr. Bemis: To the Court's ruling. I don't want to disregard the Court's suggestion, but I would like to ask one further question. The witness has said this was received by him in the mail.

Q. Can you state whether or not, Mr. Bonner, that was received in a franked envelope?

A. Yes, it was."

The pamphlet heretofore offered and received in evidence as Complainants' Exhibit 188 is a copy of one I received and I have seen this pamphlet at Norris Dam and also at Wilson Dam.

Examination by the Court:

I did not at any time see this pamphlet, Complainants' Exhibit 188, distributed other than at the points I have mentioned.

[fol. 268] Direct examination continued:

"Q. I show you what has been marked and previously offered as Complainants' Exhibit 189. If the Court please, this is another pamphlet. In this case this pamphlet was excluded. And I ask you to state whether or not you have any knowledge of the distribution of that pamphlet in Tennessee or in your district?

Mr. Fly: We renew our same objections to that as heretofore.

Judge Allen: The exhibit will be excluded, under the ruling heretofore made by the Court, and you may have your exception.

Mr. Bemis: Yes, exception, and I offer to show that if the witness were permitted to answer he would testify that the pamphlet of which complainants' exhibit 189 is a copy was distributed at Wilson and Norris Dams."

[fol. 269] Cross-examination:

I think the distribution lines of the TVA which I spoke about, the small purple lines, are considered low-voltage

lines. I do not know just exactly what voltage. We consider them as 11 kv. lines. I do not know whether it is 11 kv. or 12 kv. or 6.9 kv. or just what, but it is somewhere in the neighborhood of 11 kv. I cannot give just one answer to the question as to how long The Tennessee Electric Power Company had any transmission or distribution lines up in the territory shown on the map around Coal Creek, Petros coal fields, Wartburg and Oakdale. It has been a progressive proposition. The first line was built in this area before I came with the Company, so I do not know just when that was. I came with the Company in 1925 or 1926, but I was not in that territory until around 1930. The lines were there then. I do not know whether or not before 1925 there was a substantial bit of transmission and distribution line in this territory. The first time I was ever in that territory was around 1930, and there was a substantial block of transmission and distribution line in that territory then. In reference to the load that is now being served off of the TVA lines, which I spoke of as being a potential load for The Tennessee Electric Power Company, there was part of that load that was unserved by the Company during the years 1930 to 1935. Before 1935, The Tennessee Electric Power Company was serving a part of the customers that are now receiving power from the small lines in purple on the map. The Glen Alpine to Andersonville line was being served at that time. The Tennessee Electric Power Company sold to the TVA that eight miles of line from Glen Alpine to [fol. 270] Andersonville. I think it is right to say that the only customers that are now being served on those lines, that were being served by The Tennessee Electric Power Company prior to 1935, are customers off the line which The Tennessee Electric Power Company sold to the TVA.

I think the line shown in yellow on the map, running from Oliver Springs down to Robertsville and to Wheat, with an extension from Robertsville back up into the neighborhood of Dossett, was built by The Tennessee Electric Power Company in the latter part of 1936. I believe that the mileage of that line is approximately 16 or 18 miles all told. I do not have the figures with me, but I can check it and give you the exact mileage. It is somewhere in the neighborhood of 15 or 20 miles, I think. I am familiar with the territory. We are serving a very few customers off that line, because at the time we built that line, by word of mouth and through the press it came out that if the

people received service from The Tennessee Electric Power Company, they would not receive any service from the TVA. Of course, they wanted to get as cheap electricity as they could, which acted as block to our obtaining those customers. I should say that there were not to exceed 20 customers, which is about one customer per mile, actually receiving service from the Company.

I would not say that we went in and constructed that line without knowing how many customers we would be able to serve off that line, or knowing that the number of customers we would be able to serve were a very few. We made a study of that, and not only that, we contacted consumers and had many consumers signed up who, after it was known the TVA was going to build a parallel line, cancelled their contracts with us. I do not know when I first knew that the farmers in this area, along this line, were making surveys, finding out how much load they could secure along that line if it should be built. It was my understanding that through Mr. Moses of the TVA, the TVA had pretty well covered that whole area of the Com-[fol. 271] pany in making surveys. I do not think I knew of my own knowledge that there were any surveys being made, but I heard surveys had been made over the entire northern Tennessee district. If I remember correctly, these surveys were being made in the North Tennessee District, pretty well over the whole district before we started to build this line. I cannot answer the question whether this was a long time before this line was built, because I do not know. I cannot answer yes or no to the question whether at any time before we started to construct this line, I knew that surveys had been made. I knew that the people in that area had been discussing power, but I did not know that there had been an actual survey made, and I did not see any stakes that had been driven. I do not know the average customer density along the line running west out of Clinton, northwest to Coal Creek. The suggestion that the density is somewhere in the neighborhood of 21 customers per mile sounds high to me. I would have thought it would have been around 12 to 15 to the mile. You may be right however.

Redirect examination:

There is a purpose in the construction of the line to Oliver Springs other than the rural business which might

be attached. That line was, or it has been our plans for a good long time, to eventually tie the Clinton distribution and the Oliver Springs distribution systems together, and it is so constructed that when and if ever we want to tie those two together, we will only need to add a third wire up to where the route turns off to Dossett, and then construct a short line in between that and the distribution system of Clinton, and tie those two towns together. Tying the two towns together would give Clinton and Oliver Springs two sources of supply, which would tend to help [fol. 272] the voltage, and also eliminate long outages. When one line goes out, it could be supplied from the other direction and the continuity of service maintained. This line to Oliver Springs shown in yellow, that is the line of The Tennessee Electric Power Company, was constructed before the corresponding line adjacent to it shown in purple.

Recross-examination:

I do not remember just how many signed contracts we had on this twenty miles of line that was constructed first, at the time we constructed it. We had a good many, but I do not know just how many. I do not know how many are being served now. I said not over twenty.

I do not remember how long the line has been running from Coal Creek to Clinton, but I think it was constructed either in 1926 or 1927. I am not sure how long the line running from Coalfield into Oliver Springs has been constructed, but I think it was constructed about 1928. We have had in mind the connecting of this load from Oliver Springs to Clinton for about 7 or 8 years. The line from Coalfield into Oliver Springs is a 3-phase line and has always been that way.

(The witness was excused.)

“Mr. Marks: If the Court please, we wondered if we could take a moment at this time to complete the record on complainants’ exhibits 114, 115 and 116, which were the reports of the hearings before the Subcommittee of the House Committee on Appropriations, on the appropriation measure for the Tennessee Valley Authority for 1935, 1936 and 1937.

The Complainants have already introduced these reports as a whole in evidence, and in addition have had

copied in the record certain excerpts that they desired to call to the Court's attention.

Since then we have selected certain other excerpts which we think explain those and illuminate those referred to by the complainants.

If there is no objection to my giving the reporter a list of our excerpts, our suggestion is that they be copied in the record for the convenience of the Court, subject to the same reservation on behalf of the complainants that has already been made for the defendants, that at some time con-[fol. 273] venient to the Court we can argue the question of competence, relevance, and materiality of any of the offered excerpts. And at that time the Court can rule upon all of it.

Judge Allen: Is there any objection?

Mr. S. D. L. Jackson: If your Honor please, just during the recess I received from the defendants a list of the excerpts that they would now expect to have physically copied in the record.

I have not yet completed my check, but as I understand it, they are being offered by the defendants solely to illuminate and explain the excerpts that we were privileged to put into the record the other day.

And in the hasty check I have been able to make, it seems to me they go far beyond that, and I want the opportunity to state on the record, and I think I would like to state on the record at the time and at the place where the excerpt is physically copied into the record the reasons, the objections I have to each of these particular excerpts. I think they go far beyond any explanation of the excerpts read into the record by complainants.

Now, I may be able to complete my check here, so that I could do this possibly a little later, or the first thing tomorrow morning, whichever suits the convenience of both sides and the Court. May I suggest that procedure?

Mr. Fly: We prefer not to argue them piece-meal. I thought the Court might be willing at a convenient time to set aside a brief time when counsel for each side might argue the relevancy and competency of each other's excerpts. The Court did not endeavor to pass upon theirs item by item, and I don't think you will want to do that with ours.

Mr. S. D. L. Jackson: If I may make this suggestion to the Court, we turned over a book which has had the margin

marked in red, with the pages we sought particularly to call the Court's attention, and offer in evidence, as your Honors will recall. I understand these gentlemen have a book here with these passages which they are expecting to—

Mr. Fly: This is the same book.

Mr. S. D. L. Jackson: With your excerpts marked in blue. We have not yet had that book back. If we might have our book back I think we can put all our objections in such shape as to hand to the court more conveniently and not have a long argument.

Judge Allen: Counsel may have the opportunity to check over the excerpts, but the Court wishes to remind counsel that the entire document was received in evidence.

[fol. 274] Mr. S. D. L. Jackson: I recall that.

Judge Allen: That is the ruling of the Court, subject to reservations that counsel for both litigants should have opportunities of arguing questions of competency, materiality and relevancy.

Mr. S. D. L. Jackson: I recall that. I am trying to arrive at a suggestion as to how to most expeditiously do that.

Judge Allen: Counsel may have a reasonable opportunity to check, and expect counsel to report back to the Court when he has checked it."

[fol. 275] WILLIAM WALLACE JACOBS was called as a witness on behalf of the complainants and, having been first duly sworn, was examined and testified as follows:

Direct examination:

I am 43 years of age, live in Cleveland, Tennessee, and am Manager of the East Tennessee District of The Tennessee Electric Power Company. I have been Manager of that District for 15 years.

The map (offered and received in evidence as Complainants' Exhibit 207) shows the territory of which I am District Manager and the transmission and distribution lines which are located in that district. The lines as indicated on the legend are correctly shown. The yellow lines represent the transmission and distribution lines of The Tennessee Electric Power Company. The purple lines represent the TVA transmission lines and distribution

lines. The small red lines represent lines which distribute TVA power in this area. The red lines with cross-hatching represent a line which was constructed by a construction company in Meigs County, other than the TVA. The red lines which are in cross-hatching in McMinn County, the distribution lines, and those for the City of Dayton were constructed by the TVA. That is all of the lines, except there seems to be a short branch of a line up in Knox County which I understand was constructed by TVA though I did not see the actual construction of the line. The green lines leading from Alcoa all are owned by the Aluminum Company of America. The broad green lines are high tension lines; the small green lines are distribution lines.

I have a total of 130 employes in my field organization in this division. We are constantly making a survey and studies of the unattached loads in the area.

[fol. 276] The East Tennessee District lies between Walden's Ridge on the West and the Appalachian Mountain range on the East. It is primarily an industrial section and has a large diversity of industry. However, in the Sweetwater Valley and along the river the soil is well adapted to general farming, dairying and fruit farming. The principal load centers are all cities running from Cleveland up to Lenoir City, including Maryville, Athens and Sweetwater. Of these cities Cleveland is the largest, with a population of approximately 10,000, and the others range down to Sweetwater with a population of around 2,900.

With respect to the character and extent of the unattached industrial business in this area, there are 10 industries which require process steam. Eight of these are woodworking plants and all of the woodworking plants have sufficient wood refuse to supply their base fuel requirements. There is another group of seven plants, made up chiefly of marble quarries and clay product plants. These plants do not require process steam, but a few of them have had intermittent operations during the past several years. In addition, there are 18 industries which require relatively small amounts of power, two small flour mills, three seasonably operated gins and 13 woodworking plants. The woodworking plants all have sufficient wood refuse to generate their power requirements. All of these plants are within reach or on the existing Company lines. They all have their

own power facilities, mostly steam. However, we do serve 26 in the group with lighting and supplemental power.

The unattached commercial demand in this area is comprised largely of small stores and filling stations which do not stay open at night, and a few intermittently operated grist mills, and so on.

The unattached domestic demand within reach of existing Company lines is composed largely of small dwellings occupied by people whose incomes are in the lower bracket and who cannot afford electric service.

The unattached domestic demand or potential demand, which is not within reach of the existing Company lines at the present time, is largely small dwellings which are located away from towns, and off the main highways, highly scattered, and most of them are occupied by the people whose incomes are very low, and who probably could not afford electric service if it was made available at the minimum cost. That is true of the unattached homes beyond the reach of any electric facilities in this area.

I am familiar with the minimum requirements of the so-called "Neighborhood Plan" of the TVA—662 kilowatt hours per mile per month. I am also familiar with the minimum requirements of The Tennessee Electric Power Company under its rural electrification program—\$18.00 per mile per month. There are approximately 1,000 customers outside the reach of any existing electric facilities in this area which could be served under the minimum requirements of either the TVA so-called neighborhood plan or under the minimum requirements of The Tennessee Electric Power Company rural electrification program. We have a number of these extensions under consideration at the present time. They are not located within reach of extensions which might be made from lines which are now receiving service from the TVA. Approximately 160 miles of line would be required to serve the 1,000 customers to which I refer. I will say most of them are located east of the Company's system between Chattanooga and Knoxville and are some distance from TVA power sources. The Company has considered the extension of those lines and is now negotiating with the people for the extension of those lines. There are some of them we have been working on continuously for some time, and we will continue to do so until we either build the lines to them or give it up. [fol. 278] Assuming that we could use the TVA transmis-

sion line between Athens and Dayton, the distribution lines or system which is shown on the map as now taking TVA power could be served from the system of The Tennessee Electric Power Company. We could connect the company system with the system of these rural cooperatives. At Ooltewah we could connect with the system of the North Georgia Electric Membership Corporation; in the vicinity of Athens and Riceville we could make connection with one of those two points served; and in the northern part of the district around Solvay, the line could be served from a company distribution line around Beaver Ridge.

Cross-examination:

In answer to the question as to what our Company usually does in the way of making surveys and assuring a load before it begins construction of a rural line, the Company has a preliminary survey from which we use to determine the amount of business that can be secured from the line. We try to find out the number of customers we will have along the line. It is generally true that we try to find out whether those residences along the route of the line will buy our power if the line is constructed. I don't know that I try to find out whether the persons residing along the route of our line have signed applications or contracts to buy power from others and become members of rural corporations. As far as I know, we do not.

We have had a transmission line between Athens and Cleveland ever since I became connected with the Company, and I understand many years before then. We did not operate the distribution system in Athens up until about 1924, I believe. I would say that for a great number of years the Company has had transmission and distribution lines in this territory.

The Meigs County Membership Corporation has approximately 131 miles of lines and around 535 Customers. That figure may vary just a little. In McMinn County there are [fol. 279] two customers who formerly took service from The Tennessee Electric Power Company who discontinued their service with us and took service from the Meigs County Membership Corporation. That is between Athens and Riceville. That is all of the customers of the Meigs County Corporation that I know of which were formerly customers of our company. As to the remaining 500 odd customers,

there was a small distribution system in Decatur which served a few customers right in the town, but they were not served by my Company.

With reference to the transmission line between Dayton and Athens, which is colored purple and is shown by the legend to be a line belonging to the TVA, that line was used to deliver power from my Company's lines in Athens to serve the City of Dayton by an interchange between my Company and the TVA. I don't recall for just what period, but it was used for that purpose. My Company did not have any lines in Meigs County before TVA.

Redirect examination:

The Company has 440 miles of rural lines in this area. There are approximately 1000 rural customers who would represent sufficient density to justify the construction of lines under the minimum requirements either of the TVA or of The Tennessee Electric Power Company. The approximate kilowatt demand which would be represented by that number of customers would be 250 kilowatts.

(The witness was excused.)

CHARLES E. PERKINS was called as a witness on behalf of the complainants and, having been first duly sworn, was examined and testified as follows:

Direct examination:

I am 43 years old, reside at Columbia, Tennessee, and am Division Manager of the Middle Tennessee District of The Tennessee Electric Power Company.

[fol. 280] The map (offered and received in evidence as Complainants' Exhibit 208) shows the area which comprises the Middle Tennessee Division of The Tennessee Electric Power Company, of which I am Division Manager. I am generally familiar with the electric power facilities which are located in that area. The lines shown on this map correctly represent the transmission and distribution facilities which are located in my Division, with the exception that the distribution lines inside of the city limits and inside of the small towns and also the small lateral extensions off of rural lines are not shown, due to the scale of the map.

In this area the Company at the present time has approximately 823 miles of rural lines, approximately 80 miles of 160,000 volt lines, approximately 353 miles of 44,000 volt lines, and approximately 40 miles of 22 kv. lines. The lines shown in purple, according to the legend, are lines belonging to the TVA, all of which shown in broad lines were constructed after I became Division Manager of the Middle Tennessee Division. The red lines represent lines built by crews using TVA rolling equipment and wearing in some cases emblems showing that they were TVA employees, and with material I have seen shipped in addressed to TVA.

These lines are lines of rural cooperatives, as indicated by the legend, which at the present time are distributing TVA power.

The broken line going northeast out of Columbia represents a proposed line which has been staked out by the TVA between Columbia and Murfreesboro. The broken line going somewhat southwest of Columbia represents the line that has been staked out going down to the Victor Chemical Plant located near Mount Pleasant. The dotted line between Pulaski and Fayetteville represents a line staked out for a 44 kv. line between Pulaski and Fayetteville. The dotted small red lines in the vicinity of Columbia represent lines that have been staked out on the rural cooperative line. I have seen the stakes on all the lines which I have referred to as being staked out.

[fol. 281] The general character of the district comprising the Middle Division of The Tennessee Electric Power Company is varied. The section over on the eastern part of it in Williamson, Maury, Marshall, Moore, Lincoln and Giles Counties, is a blue grass section, well adapted to farming and dairying. It is also an area in which most of the industrial loads of the Company occur and in which the density of population is greatest.

Then there is a section in the middle part of the territory in Dickson, Hickman, Lewis, Lawrence and Wayne Counties, and parts of Perry County, which consists of table land, which is very sparsely settled, which is timbered with scrub oak and pine, and where the soil is not very fertile. Then along the Tennessee River Valley, in the western part of the territory, there are good farm lands and these merge out into hills of a very rough character. Then over in the southwest portion of the map is soil which is very silty, which washes very easily, and which is used mostly for cotton

raising, and which is somewhat lower. The load centers in this area are the towns which are indicated in the eastern portion of the territory, Fayetteville, Lewisburg, Columbia, Mt. Pleasant, Dickson, etc. Columbia, Tennessee, is the largest city, with approximately 10,000 population; Lewisburg has approximately 4,000 and Fayetteville is of like size.

We have 141 field employees in this territory. The Company has made field studies of the unattached business in the area in this Division. The field organization out of the local offices make surveys, and they are assisted in these surveys by the district organization. They are continually making these surveys as to unattached business, and as to the development of the existing business throughout the entire territory.

I am able to state the character and extent of the unattached industrial business in this division. There are four [fol. 282] plants which use process steam. The largest one of these is located at Wrigley, Tennessee, and it is a combination wood alcohol distillation plant and an iron furnace. Their process is such that they are not a power prospect. Then we have two milk plants that take somewhere around a third of their power from The Tennessee Electric Power Company and the rest of it they make themselves, using cast off steam in their process. All of these steam processing enterprises, except the Tennessee Products Plant at Wrigley, are located on our lines. The Tennessee Products Plant is located on a single phase line approximately 12 or 15 miles from a sufficient voltage line to serve it.

Referring to other industrial business there are six flour and feed mills, some of which operate intermittently. All of them have their own plants, which would have to be discarded if they purchased power. Then there are three ice plants, two of them being very small, that make their own power. When I say they make their own power, I do not mean they convert their power to electric power but that they use mechanical power. They are on the lines of The Tennessee Electric Power Company, and they take, in most cases, a small amount of power for lighting. Then the southern tier of counties in this district mostly raises cotton, and there are a large number of cotton gins in that area. According to the best information I have available there are around 80 cotton gins. Of these The Tennessee Electric Power Company is serving 14, 8 others are directly on the

line of The Tennessee Electric Power Company; 13 are from five to nine miles off the company lines; 13 are from ten to fifteen miles off; 16 are on single phase lines; and 16 are on rural lines distributing TVA power, or in the case of the Lincoln County Electric Membership Corporation, directly in the territory of the TVA.

The unattached commercial demand in this area is scattered in nature, being mostly small stores at cross roads that do not stay open at night, a few grist mills that operate [fol. 283] maybe one or two days a week, and then a few sawmills that move from place to place and have refuse fuel for power purposes.

The unattached domestic load, within reaching distance of existing Company lines or existing electric lines in this area, consist of tenants and low income group people who are not able in most cases to wire their homes and take electric service. In my division there are 1200 houses of that character within reach of existing Company lines inside of the city limits of incorporated towns and 2000 on existing rural lines of the Company. It represents about 80% of the attached houses being served in cities and about 70% of them in rural territories.

I am familiar with the minimum requirements of the TVA so-called Neighborhood Plan. I have seen pamphlets describing this plan, requiring 662 kilowatt-hours per mile per month. I am also familiar with the minimum requirements of The Tennessee Electric Power Company rural electrification program. The domestic potential demand or unattached homes outside of the reach of the existing electric power facilities in this area is widely scattered, being mostly away from the large cities and industrial centers, being away from the main paved highways, and being for the most part similar to the unattached business along existing lines. According to information and my knowledge of the territory, there are only eight extensions that might be feasibly handled or might be feasible under either the TVA so-called Neighborhood Plan or the minimum requirements of The Tennessee Electric Power Company rural electrification program. These eight extensions are widely scattered, at various points in the territory, would require approximately 70 miles of line to serve them, and counting all of the houses, both good and bad, would represent around 525 houses.

[fol. 284] Assuming that The Tennessee Electric Power Company has generating capacity for such purposes, the

distribution lines which have been constructed and are being served by the TVA in this area could be served from the transmission or distribution facilities of The Tennessee Electric Power Company. This would in some cases require the construction of substations along the line, or a new line construction. The change, however, would be of a very minor nature.

Referring to Complainants' Exhibit 208, it is noticeable that the lines which are now distributing power from the TVA have been built in most cases very close to the various towns of large population, and that they occupy the highways leading out from those towns. Most of the lines are also in the chief load centers in the district and where the most population is. These lines having been built so close to the towns and also occupying the highways, it would force The Tennessee Electric Power Company to parallel those lines or build through sparse territory to get out beyond to serve additional customers. It also prevents the Company in some cases from looping together its lines for the benefit of interconnections and more dependable service. As such, these lines form what I term an economic block, preventing the Company from expanding its business in a logical manner from time to time.

Cross-examination:

The smaller purple lines described by the legend as lines owned and operated by TVA are what we class as 11,000 volt class of lines. The Lincoln County proposition, which also extends over into Giles County, in the neighborhood of Frankewing and also over a little bit in the bottom or lower part of Giles County, connecting to the Ardmore-Pulaski [fol. 285] line, taking those into consideration, make a total of 170 miles of these lines. About 695 rural customers are being served off of those lines. None of these rural customers to my knowledge were formerly receiving service from The Tennessee Electric Power Company.

It is my understanding that the small lines shown in red in McNairy and Hardin Counties are operated by the Pickwick Electric Membership Corporation. Although I have not seen any deed or transfer, it is my understanding that those lines are owned by that Corporation. About 35 miles of rural lines in McNairy and Hardin Counties are owned by The Tennessee Electric Power Company. I do not know the range of years in which those lines were constructed.

Some of them were constructed before 1933 and some after. In the general conduct of our business, we are always constructing lines from time to time. I do not know the proportion. To the best of my information, in excess of 100 miles of lines belong to the Pickwick Electric Membership Corporation. Around 760 rural customers are being served from these lines. Not any of these customers that I know of now being served from those lines were served by my Company.

The small red lines running down to the lower left hand corner of the map in Maury County have been constructed very recently. I do not know whether the ownership of those lines is vested in the Duck River Electric Membership Corporation to date or not, but it is understood the Duck River Electric Membership Corporation will own them after completion. It is shown on the map to be owned either by a municipality or a cooperative. I supervised the preparation of this map. I think the lines are owned by the Duck River Electric Membership Corporation, as they are working along as the lines are being built. According to the newspaper announcements of the building of these lines in Maury [fol. 286] County, Marshall County, extending a little bit into Hickman County and a little bit into Williamson County, there will be about 155 to 160 miles in those counties. This report also said there would be around 600 customers. To my knowledge there were no customers who stopped buying from us and began buying from the Duck River Corporation. I have been with the Company since 1926. I went to this territory in July, 1935.

"Q. I think you have roughly estimated that about 600 customers were being served by the lines in Lincoln County, about 700 by the Pickwick Electric Membership Corporation, about 643 by the Duck River Corporation. I think you also testified that your company—none of these customers were formerly served by your company. Now, I think you testified also, that these customers represented the potential load. Your testimony is that the load then, this so-called potential load of your company, consisting of these two thousand odd customers, has been unserved for a great number of years, during which time your company has had lines in this general territory.

Mr. Bemis: Of course I object to that. I do not think that correctly summarizes what the witness testified, at all.

The Court: He may answer.

Mr. Bemis: Exception.

Judge Allen: Mr. Perkins, in answering that question, if it does not restate what you stated, you may point that out.

A. Well, I did not give those figures that you used, and the customers served by any of the cooperatives. They are fairly close, however. I did testify that the potential load in this area has been taken away, as my statement was, economically blocked by building of these lines. While the company did have lines in parts of this territory, and as the company business increased—

Mr. Fly: I move to strike out that testimony. The question is whether or not they had served for a number of years.

Judge Allen: Answer the question.

A. Yes."

Redirect examination:

The potential load in an area changes from time to time. I cannot speak generally beyond 1935, but the economic [fol. 287] conditions change, and customers that can be served this year, that can wire their homes and buy appliances necessary for the support of the line extension, may not have been two or three years ago in a position, economically, to have done so. Also in the territory there are additional houses built and population increasing gradually, and added to, so those lines that were not feasible several years ago may be entirely within the bounds of possibility today.

An industrial plant which uses process steam is not a potential electric power customer because steam is necessary in the manufacture of their products, and it is possible to use this steam through some power generating unit first, and then use the exhaust steam in its process, thereby generating the power at a very low cost figure.

(The witness was excused.)

[fol. 288] CLARENCE WATSON was called as a witness on behalf of the complainants and, having been first duly sworn, was examined and testified as follows:

Direct examination :

I am 46 years old, reside in Murfreesboro, Tennessee, and have been Division Manager of the Cumberland District of The Tennessee Electric Power Company since July 1935. Prior to that I was Division Manager for the Middle Tennessee District. The map (offered and received in evidence as Complainants' Exhibit 209) embraces the territory within the limits of the Cumberland Division, of which I am Division Manager. The lines which appear on this map show the transmission and distribution facilities which are located in that area. There is a total of 865 miles of distribution lines in this area operated by The Tennessee Electric Power Company, 170 miles being within incorporated towns and 695 miles of rural lines and small communities. The Company has 134 miles of 110 kv. high tension transmission lines, 343 miles of 44 kv. lines and 240 miles below 15 kv. lines. All of the lines to which I refer are shown on this map, with the exception of the distribution lines within the city limits and the rural lateral lines.

The lines in purple represent the TVA high tension transmission line passing through this district, extending from Wheeler Dam to Norris Dam. The lines in red represent the distribution lines constructed by construction crews using TVA cars, with TVA licenses and TVA employees, some TVA employees wearing buttons and numbers. All of the lines in red were constructed by the TVA. The lines in Bedford and Franklin Counties are connected with the TVA station in Ardmore, Alabama. The lines in Wilson and Rutherford are connected with the TVA substation near Columbia, these two being interconnected—that is the only source of power.

[fol. 289] The light green lines shown at Tullahoma show the distribution lines in the city of Tullahoma purchasing power from The Tennessee Electric Power Company at wholesale. The light green lines shown at Lebanon show the City of Lebanon purchasing power from The Tennessee Electric Power Company at wholesale.

Examination by the Court :

The white line running from Murfreesboro to Lebanon indicates a highway.

Direct examination continued:

There are 150 field employees in this division. The Company has made studies respecting the unattached business which is located in this area. Each local manager in the district organization is continually making those studies and investigations on the extension of new business and rural lines. The division managers cooperate in those studies. From those studies and investigations I am able to state the character and extent of the unattached industrial business in the territory embraced in my division. We have seven unattached industrial plants, using steam for processing purposes on account of their particular process. Six of these plants are purchasing a small amount of power from The Tennessee Electric Power Company and are located within easy reach of the Company's lines. We also have eleven plants that had their own power units installed several years ago that are still in good efficient operating condition. We are selling a small amount of power to three of these plants. It will be necessary for these plants to abandon or junk their power units in order to purchase power from a central station. We also have five cotton gins, seasonally operated about two or three months in the year. All of these are in easy reach of The Tennessee Electric Power Company lines. These power units to which I [fol. 290] have referred are not in all instances electric power units but some are steam, oil, and gasoline engines which produce mechanical power.

The unattached commercial demand is mostly scattered stores that do not open at night and a small power load of grist mills and saw mills. These saw mills, of course, use sawdust and refuse for fuel, and move around from place to place. That covers most of the commercial demand. In referring to these saw mills, I am referring to those small operations which are itinerant in character.

The unattached domestic potential demand which is at the present time within reach of the existing power facilities in this area is composed mostly of small dwellings occupied by small renters in the lower income class and not financially able to pay their current bills, with service available. We have approximately 2,200 such homes along rural and small community lines and approximately 1,250 within the incorporated towns, or a total of 3,450, within reach of existing service from The Tennessee Electric Power Com-

pany facilities in this area. The percentage of unattached homes is about 30 per cent. The percentage is higher in the rural lines than within the corporate limits of villages, the percentage of unattached homes on the rural lines averaging from 35 to 40 per cent.

Most of the unattached domestic potential demand which is not at the present time within reach of any existing power facilities as now extended, is located away from the larger towns and industrial centers, and also is located away from the main highways, and is located on scattered rural roads. Most of these unattached dwellings are small homes and widely scattered, and are inhabited mostly by tenants and people in the lower income class not financially able to pay their current bills. From the studies and investigations we have made, there are approximately 615 customers in the division outside of the reach of any electric power facilities as now extended, that in my opinion could be served under either the minimum requirements of the TVA's so-called Rural Electrification Plan or under the minimum requirements of The Tennessee Electric Power Company's Rural Electrification Program. They are widely scattered over 14 counties, involve 21 different extensions ranging from one mile to thirteen miles in length, and would necessitate about 95 miles of line. I am, of course, familiar with the minimum requirements of the TVA's so-called "Neighborhood Program" and also with the minimum requirements of the Rural Electrification Plan.

The distribution lines which I have testified about as now receiving service or distributing power received from the TVA could be served from the transmission or distribution facilities of The Tennessee Electric Power Company. The lines in Franklin County could be served from the distribution lines at Winchester, the lines in Bedford County could be served from the distribution lines at Shelbyville, the lines in Rutherford County could be served from the distribution lines at Murfreesboro, and the lines in Wilson County could be served from the distribution lines at Lebanon. There may be one or two short distribution extensions which would have to be made. Other than that, there would be no change in existing facilities.

In answer to the question as to the extent the construction of these distribution facilities which are now distributing TVA power affects the possibilities of future growth

and expansions of the existing facilities of The Tennessee Electric Power Company in this area, I refer to Complainants' Exhibit 209 showing the location of these lines and you will note that most of these lines are built in the vicinity of our larger towns; for instance, Winchester, Shelbyville, Murfreesboro and Lebanon. These lines are built up within easy reach of the city limits of these larger towns and on the roads leading from these towns up to the present existing lines of The Tennessee Electric Power Company, and on most roads cause an economic block prohibiting the Company from expanding or extending its lines in this particular radius for future potential business.

[fol. 292] Cross-examination:

I cannot give you exactly the number of miles of small lines below 15,000 volts in Wilson County which belong to The Tennessee Electric Power Company, as I haven't that separated by counties. The line going out from Lebanon toward Gladeville, which is under 15,000 volts, is about 15 miles in length. But I could only guess as to how many miles of such line there are in Wilson County belonging to the Company. I would guess between 75 and 100 miles. I have been occupying my present position in this district since July 1935. I cannot recall how many miles of similar lines existed in Wilson County belonging to The Tennessee Electric Power Company before the time I came with the Company, but about 25 or 30 miles have been constructed there since 1935.

I would guess that there were about 150 miles of line shown in red in Wilson County. I cannot give you the number of customers served off of those lines by counties. There were about 700 customers being served off of those small red lines by the Middle Tennessee Electric Membership Corporation in Rutherford and Wilson Counties. That does not include Bedford County. None of those 700 customers which I spoke of stopped taking service from the Company to take service from the Middle Tennessee Electric Membership Corporation. The Corporation which owns the lines in red as shown in Bedford County is supposed to be the Duck River Electric Membership Corporation. About 450 customers are being served by the red lines in Bedford County. Those are supposed to be the lines of the Duck River Electric Membership Corporation and

are shown on my map to be the lines of a cooperative. None of our customers in Bedford County stopped service to take service from the Duck River Electric Membership Corporation.

(The witness was excused.)

[fol. 293] PAUL E. SHACKLETT was called as a witness on behalf of the complainants and, having been first duly sworn, was examined and testified as follows:

Direct examination:

I am 51 years old, live in Chattanooga, and am the Industrial Agent of The Tennessee Electric Power Company. I am generally familiar with the Company's facilities and business in the Chattanooga and Nashville Districts. There is comparatively no unattached industrial power business in the Chattanooga District. There are about 21 plants in Chattanooga to whom we do not supply their power service. There are 8 of these that have wood refuse which they use for fuel in the generation of power or the manufacture of power through mechanical means; there are 8 others that have need for large quantities of process steam; and out of the total there are 3 others that have their own electric power generating units. In my judgment, these three represent potential customers for the future. As a matter of fact, we have been advised by some of them that when it became necessary to spend large capital investments on improvements, or for additional new equipment, they would then be interested in using our service. If we secured these three prospects, the total number of kilowatts that would be connected would be approximately 2,350.

The total number of domestic customers in Chattanooga is 29,365. At the present time, there are approximately 4,000 residences in the Chattanooga District of the Company which for some reason or other do not use our service. Some of these are homes occupied by a group of people with very low incomes. A large percentage are people that rent property from landlords that will not wire the property for service, and a good percentage of them are not occupied at all. Of the total number of houses in Chattanooga, there are about 13 percent which are unattached. All of them

are in very close reach of our services, and could be served by us very easily, both domestically and industrially.

[fol. 294] There is practically no unattached industrial power business in the Nashville District. There are some, like in the Chattanooga District, that we do not serve one hundred percent with service due to some reason or other. There are 20 such plants in Nashville. Three of them use wood refuse for fuel in the manufacture of power through mechanical means or through the generation by steam of electricity. Eleven of them use large quantities of process steam, and these we do not serve one hundred percent. Out of the total, there are 5 in that district that have their own electric generating unit, which, in our judgment, like those in Chattanooga, are potential prospects of ours, because in instances we have been advised that when the time came when it was necessary to spend a great deal of capital on improvements, they would purchase service from the Company. When I say there are 5 which have their own power units, I mean there are 5 which have their own power units, which do not require steam for processing or have refuse fuel which can be used. To some extent, all of the industries which I have mentioned in both Chattanooga and Nashville have their own individual power units, and all of them are now being served to some extent by The Tennessee Electric Power Company. Approximately 1,350 kilowatts would be connected if we secured those 5 industrial enterprises to which I have just referred in the City of Nashville.

The total number of domestic customers in the Nashville District is 42,461. In reference to the character of the unattached domestic demand within reach of the distribution facilities of the Company in the Nashville District, there are, at the present time, approximately 9,000 prospective domestic users, or 22 percent who for some reason or other do not take service from us. In that District, as it is largely in the Chattanooga District, those houses are occupied by people of low incomes and a large percentage of them are rentals from people that will not spend the money to wire their homes. Some of those houses, a good percentage of them, are not occupied at all. The 9,000 odd houses to which I refer are either on existing Company [fol. 295] distribution lines or within reach of existing lines. Both domestic and industrial concerns in the Nash-

ville District are in easy reach of service. I would say, speaking in percentages, that the Company's facilities in the Nashville District are 100 percent adequate to serve the unattached business there.

The Tennessee Electric Power Company did serve the L. N. Gross Company. That Company is a dress manufacturing concern, and recently constructed a building in the city of Fayetteville in the early part of 1937. During the construction period we served the contractor with temporary power service, but before the building was completed we were authorized by Mr. Gross to connect permanent service to the plant, which we did.

In answer to the question how the L. N. Gross Company came to locate its plant in Fayetteville, in the early part of 1936, Mr. L. N. Gross came to Chattanooga and consulted with us as to the possibility of establishing a branch plant in the Tennessee area, a branch of a plant that has been in operation in Cleveland, Ohio, for a good many years. After investigating a number of locations, we succeeded in interesting the City of Fayetteville, and arranged a meeting between the city authorities of Fayetteville and Mr. L. N. Gross. After several meetings were held, which meetings I attended, an agreement was reached and the building was constructed. The TVA is at the present time serving the L. N. Gross Company. At the time this service was connected, the electric power load of the L. N. Gross Company was approximately 75 kilowatts.

"Mr. Bemis: You may examine.

Mr. Fly: No questions.

Mr. Bemis: That is all.

Judge Allen: Just a minute. Did you ever have a contract with the L. N. Gross Company to serve them with electric power?

The Witness: We had a verbal contract, yes.

Judge Allen: Did you have any specific contract, with the terms of the contract set, that is between certain dates for a certain number of years, or anything of that kind?

[fol. 296] The Witness: No, we did not.

Mr. Bemis: Well, I might just ask one other question to clarify the situation."

It was necessary for the Company to construct special facilities to serve this customer. We had to extend our serv-

ice and construct a transformer station of sufficient capacity for the amount of power that they desired to take. The construction of those facilities was authorized by the L. N. Gross Company, with the request that we connect our service as quickly as we possibly could, as they had had a number of delays and were anxious to get the plant in operation. In the ordinary course of our business, it is not customary in all cases to have written contracts where we extend service to industrial customers. Nor is it customary in all cases where we have to construct poles or additional lines and substation facilities.

(The witness was excused.)

CLEM R. WINKLER was called as a witness on behalf of complainants and, having been first duly sworn, was examined and testified as follows:

Direct examination:

I am 41 years old, reside in Jackson, Tennessee, and am General Sales Manager for the West Tennessee Power & Light Company.

The map (offered and received in evidence as Complainants' Exhibit 210) shows the territory of the West Tennessee Power & Light Company. I am generally familiar with the electric power facilities that are located in that area.

The West Tennessee Power & Light Company has 30 miles of 110 kv. line and 60.6 of 66 kv. line. The Company has 193.6 miles of rural lines of 13 kv. or less located outside of the incorporated towns. The lines shown on the [fol. 297] map in red represent the lines of the Southwest Tennessee Membership Corporation, and in the lower part of Gibson County, the lines belonging to the Gibson County Electric Membership Corporation. The lines shown in red were constructed by the TVA.

"Mr. Fly (interrupting): That is all right."

Mr. Bemis: It is admitted, is it, Mr. Fly, they were all constructed by Tennessee Valley Authority?

Mr. Fly: Yes."

The lines in purple represent the transmission lines of the TVA. This line on the east is a 110 kv. line, which

extends from Pickwick Dam to Jackson. Then there is another line which goes north from Jackson up to Milan and over to Trenton. That is a 44 kv. line, completed to Milan, then incomplete but in process of construction between Milan and Trenton. Then there is a 44 kv. line down to Bolivar and a 12 kv. line from Bolivar to Somerville. The narrow red lines are served from a sub-station located in Jackson, Tennessee, just outside of Jackson. The lines in green represent the line of the Bells Water & Light Company, which are served wholesale by the West Tennessee Power & Light Company. There are 46 communities having a population of 100 or over in the area served by the West Tennessee Power & Light Company. Twenty-three of these communities are served by my Company directly or indirectly; nine receive power either from membership corporation lines or the TVA direct; and 12 have no service, 2 of them having generating plants of their own. Covington, Tennessee, which is one of the two, has a generating plant and distribution system of its own. Then 2 miles south of Jackson, the Bemis Bag Company has a cotton bag [fol. 298] mill, and they have their own town for their employees. They manufacture electricity for use in their own plant and serve the houses in the town which house the workers in the mill.

The area embraced in the West Tennessee Light & Power Company's service area is highly rural territory, with very few industries, except in Jackson and possibly in Humboldt. It has a very large negro population, the average being 40 percent, and, in one county we have a negro population of 73 percent. The houses are widely scattered. The Company is continually making studies of the unattached business in this area. We have five division offices in the territory, and in addition to their operating duties, the division superintendents assist the sales department in making surveys. These observations or surveys are in turn forwarded into the general office in Jackson. Quite frequently I make trips, or some of the other officials make trips, into the territory to look into the potential demand and in checking the suggestions that have been received from the field. In that way we are able to keep up with the potential business and also with the operating business.

Referring to the unattached industrial power load in the territory of the West Tennessee Light & Power Company,

there are nine plants in Jackson and Humboldt which are unattached. Eight of these plants are woodworking plants and have mechanical power plants and require steam for processing work. In addition to that, they have an enormous amount of fuel which they utilize under their boilers and have no other way to dispose of. The eight woodworking plants are located on our lines and we serve them a small amount of electricity for light and power purposes. The balance of the unattached industrial load is made up of flour and feed mills, ice plants, cotton gins and grist [fol. 299] mills. There are three flour and feed mills located in the territory. To one of these we serve approximately half of its load, which came about when it outgrew its present mechanical power plant. The other two are furnished with a small amount of power and light. There are three ice plants, to one of which we serve quite a large part, supplemental to its mechanical power plants. They buy small amounts of power for lights. These plants do not generate electricity but have steam power plants. Of the 46 cotton gins, which have a highly seasonal load, three are located on our lines, and take a small amount of power for lights. All of these industrial plants have their own power units, all in good shape, which they would have to throw away or junk if they took on our power.

The unattached commercial demand in this territory consists of grocery stores, filling stations and grist mills. The filling stations and grocery stores are hardly ever open at night. The grist mills operate one to two days a week.

With respect to the unattached domestic demand which is at the present time within reach of the existing Company lines, there are approximately 2,300 potential or unattached domestic customers, who are located on Company lines or within 1,000 feet of Company lines. These consist of small rented houses, where the landlords do not feel that they can wire the houses and still be able to collect it in the rent, and probably if the houses were wired, the occupants could not pay for electric service. The number of these unattached customers is about 29 percent of the total number of customers we have.

The potential domestic business in this area which is outside of the reach of the present Company lines, as at present extended, is very widely scattered and consists in

[fol. 300] the main of tenant houses located on large plantations, small one or two room houses, and of people who have a very small cash income and probably would not use electricity if made available to them.

I am familiar with the minimum requirements under the TVA Neighborhood Plan—662 kilowatt hours per mile per month. The Company does not have a published or printed rural electrification plan. We are rather a small company and can keep in pretty close touch with any extensions that might be possible. However, we usually limit those extensions to those lines where we are pretty sure we can get a minimum of \$20.00 per month per mile, and the number of customers will run five per mile. There are approximately ten locations or extensions that could be made in this territory under the minimum requirements of the TVA so-called Neighborhood Plan, with a total of 39.2 miles and incorporating approximately 232 customers. The approximate kilowatt demand of that present unserved business would be somewhere around 50 or 60 kilowatts.

These line extensions to which I refer are not line extensions from existing lines of the West Tennessee Power & Light Company. We would have to make, in most of the cases, quite a lengthy run to get them. They are not in reach of any extensions that might be made of the lines that are now using power from the TVA, as the Southwest Tennessee cooperative would have to make considerable extensions to get to those various locations.

The distribution lines which are receiving and distributing TVA power could be served by the West Tennessee Power & Light Company through connections which might be made in its system. The TVA substation in Jackson is approximately 2,000 feet distant from our power plant and the lines radiating from that could be connected up with an extension of approximately 2,000 feet. In Brownsville, our substation is approximately $\frac{3}{4}$ mile away from the lines and in Covington probably 1,000 feet. Those distances would have to be run in line and then probably installations made to conform to the voltage of those lines.

[fol. 301] The City of Jackson, Tennessee, has entered into contract with the TVA for the purchase and distribution of power. Previously the City of Jackson generated and distributed a part of its power for municipal purposes, and on October 15, 1935, the City entered into a contract

with TVA for the purchase of power for municipal purposes. The date of initial delivery of that power was about July 18, 1936. Then, on September 1, 1937, the City of Jackson entered into another contract with TVA for the purchase of and distribution of TVA power by the City to residents of the City of Jackson, to be distributed to them. Prior to that time, the City did not sell and distribute electricity to domestic customers and prior to such contract with TVA those domestic customers were served by the West Tennessee Power & Light Company. The City of Jackson is now selling and distributing power to former customers of the West Tennessee Light & Power Company. The memorandum (offered in evidence as Complainants Exhibit 211) is a list of customers which we term lost by us to the City of Jackson, who are now being served with TVA power. There are 14 customers on the list. The first one was connected on October 8, 1937. The data on the list is correct to my knowledge. The last column shows the amount formerly paid by these customers to my Company over the 12 months ending September 30, the total being \$5,954.26.

"Mr. Fly: If the Court please Complainants' Exhibit 211 for identification, except for the misleading reference there to 'Jackson TVA' Municipal distribution system clearly shows that this is a purported list of customers which the company has lost to the city. And according to the witness' testimony the only possible connection with the Tennessee Valley Authority is that pursuant to contract it sells power at wholesale to the city. I therefore object to the exhibit as incompetent, irrelevant and immaterial."

Examination by the Court:

TVA does not serve any of the customers listed on Exhibit 211. The City of Jackson serves them.

[fol. 302] Direct examination continued:

The City of Jackson, however, does have a contract with the Tennessee Valley Authority to furnish it power for the purpose of distributing to domestic and other customers.

"Mr. Fly: We admit we sell them power at wholesale. There is no question about that. There is no need to have the witness argue this point.

Judge Allen: The objection is sustained, the exhibit is excluded upon the ground that the Tennessee Valley Authority is not shown to sell to these customers. The sale is the act of the municipality of Jackson.

Mr. Bemis: Exception, and may the record show our purpose in offering this evidence is to show the damage which has already accrued, and the threat of future damage to this complainant company."

One of the customers on the list (Complainants' Exhibit 211) is the Thompson Baking Company. The letter dated November 2, 1937 (offered in evidence as Complainants' Exhibit 212) is the original letter which was received by us from the same Company, namely, the Thompson Baking Company.

"Mr. Fly: Are you familiar with the handwriting of Mr. Thompson?

The Witness: Yes sir, I am.

Mr. Fly: Are you willing to swear of your own knowledge that that is his signature?

The Witness: Yes.

Mr. Fly: May it please the Court, we object to this on the ground it is incompetent, irrelevant and immaterial. I believe that exhibits of precisely the same general character, and I might say rather revealing similarity of wording, were offered here a few days ago and excluded, where the customer writes to the power company, and recites certain facts.

Judge Allen: The objection is sustained and the exhibit is excluded. It is true that the Courts in certain cases where a conspiracy in restraint of trade for instance is shown, have admitted evidence in the nature of hearsay, where it is shown to be relevant. Here the evidence proffered is not shown to be relevant and material. The fact, if it be a fact, that the city councils, municipal administrations, cooperatives, private industries or customers are seeking to secure TVA power because it is cheaper than [fol. 303] that distributed by complainants is irrelevant and immaterial under the law applicable to this case. The fact an authorized public agency charges rates that will

draw complainants' customers away does not affect the issues. *Springfield Gas Company vs. Springfield*, 257 U. S. 66, at 70.

Mr. Bemis: And we may have our exception.

Judge Allen: You may have your exception."

The letter (offered and received in evidence as Complainants' Exhibit 213) is a mimeographed letter under the name of the Tennessee Valley Authority, Department of Electricity, and signed by Earl R. Wall as Division Manager, addressed to applicants for TVA electricity in Madison County, Tennessee. Madison County is in the territory served by my Company. The letter was mailed in a franked envelope, with "Tennessee Valley Authority" in the upper left-hand corner, to Mrs. E. K. Randolph, on the lower Brownsville Road, and handed to me by her son, William Randolph. Mrs. Randolph is not at the present time a customer of the West Tennessee Company. (Counsel for defendants thereupon conceded that this letter was sent out and distributed as indicated on the face of the exhibit.)

Cross-examination:

The towns of Somerville, Bolivar, Milan and Trenton, which are shown on Complainants' Exhibit 210 to be connected to purple lines, which by the legend are described as lines owned and operated by TVA, generated and owned their own distribution systems before 1933. They were not formerly customers of my Company. The transmission lines shown in yellow from Memphis to Ripley and from Ripley to Brownsville, and thence to Jackson and from Jackson to Humboldt, were built in the latter part of 1925. The lines in red in Madison, Haywood and Tipton counties are owned by the Southwest Tennessee Electric Membership Corporation. The line in Gibson County, and [fol. 304] I understand also the line that goes up to Gibson County, is owned by the Gibson County Electric Membership Corporation. In answer to the question whether any of the customers served off of those lines stopped service from our Company to take service from the Southwest Tennessee Corporation or the Gibson County Corporation, the town of Gibson, Tennessee, did so. The town of Gibson was not taking service directly, but the Gibson Power & Light Company which served that town was tak-

ing service wholesale from the West Tennessee Power & Light Company at Humboldt. The transmission line from Humboldt to Gibson was owned by the Gibson Power & Light Company. I am not familiar with the circumstances surrounding the acquisition by the Gibson County Corporation of the lines in the Town of Gibson.

As shown on the map the West Tennessee Power & Light Company has 193.6 miles of 13 kv. or less lines outside of incorporated towns. In answer to the questions whether we call such lines rural transmission or rural distribution lines, they connect towns, and at the same time they serve the customers along the line, and some of them are just lines to rural communities. Some of these lines serve a dual purpose of transmission and distribution. They pick up the towns and communities on the way.

I have been with the West Tennessee Power & Light Company since 1925 and have been located in Jackson. I believe it is correct that in or around 1931 the citizens of Jackson voted to issue bonds to acquire a municipal distribution system. I don't know about the date, but they did vote it, but the bonds were never sold. There was an election back in that time sometime, but I don't know whether it was 1931, and the vote for the bond issue carried. Aside from the wholesale service that my company rendered to the Gibson Power & Light Company, the only customers who stopped service from my Company to take service from the Gibson County Corporation or the Southwest Tennessee Corporation are those that I have mentioned in the City of Jackson; none from the rural cooperative lines.

[fol. 305] The customer that our Company sold power to on a wholesale basis at Humboldt was the Gibson Power & Light Company. I can't answer whether that Company has gone out of business. I don't know whether or not they disposed of their property. I do not know whether they own any property in Gibson now. I do not know it to be a fact that the Gibson Power & Light Company was insolvent and that its properties were sold at public auction. I have no knowledge of that incident. I was here the other day when Mr. Wisdom testified but I don't remember him saying that he attended a public auction at which the properties of the Gibson Power & Light Company were sold, and I did not attend that sale myself.

Redirect examination:

Referring to Complainants' Exhibit 213, which is the form letter addressed to applicants for TVA electricity in Madison County, Tennessee, the rural cooperative which serves customers in Madison County is the Southwest Tennessee Electric Membership Corporation. Mrs. Randolph, from whom I received this form letter, is being served by this Southwest Tennessee Membership Corporation. At the time that the Southwest Tennessee Membership Corporation or the TVA was constructing these lines in Madison County, my Company had some distribution lines approved for construction, a line on the lower Brownsville Road and on that portion of the road where Mrs. Randolph happens to reside, as well as an extension on the Humboldt Road north of Jackson. Those lines were approved for construction and material ordered about December 15, 1936. Because of the weather, and awaiting receipt of material, no actual construction was started. Then on January 1, 1937, we received an order from the Railroad and Public Utilities Commission styled "Docket 2025", making it [fol. 306] necessary for electric light companies, public utilities, to receive permission from the Commission before they could construct any lines of 4,000 volts or higher, or costing more than \$5,000. Although these lines were already approved by the officials of the Company and the material ordered, we wanted to cooperate with the Commission, so we filed formal application for the building of these two lines. The line on the Brownsville Road was 3.4 miles long and the line on the Humboldt Road was 4.1 miles long. The lines of the cooperative to which I have referred were constructed between the hearing in February on this line and May 18, when the Company was denied a right to build the line.

Recross-examination:

Complainants' Exhibit 213 does not bear a date. I referred in my testimony to an order by the Public Utilities Commission of Tennessee to utility companies operating in Tennessee, ordering those companies to submit construction projects of a rural character for approval by the Commission before the initiation of construction. I also spoke of the denial by the Tennessee Public Utilities and Railroad Commission of permission to my Company to build a line

on the lower Brownsville Road. I do not have with me a copy of that order denying permission to build the line. I am not familiar with the entire contents of the order but I have read it.

The document (offered and received in evidence as Defendants' Exhibit 3) is a copy of the opinion and order of the Tennessee Railroad and Public Utilities Commission, dated May 18, 1937, under Docket 2030, to which I have referred. It appears to be a correct copy of such opinion and order.

[fol. 307] Redirect examination:

The line of the Southwest Tennessee Cooperative Association had been constructed prior to the time this order dated May 18, 1937 (Defendants' Exhibit 3) was enacted. The construction started immediately after the hearing in February. We did not receive this notice until May. The line was completed before the order denying permission to extend our line had been rendered.

(The witness was excused.)

OFFERS IN EVIDENCE

Counsel for complainants offered in evidence and the Court received as Complainants' Exhibits Nos. 214 to 223, inclusive, copies of franchises issued by the Counties of Colbert (Exhibits Nos. 214 and 215), Franklin (Exhibit No. 216), Lauderdale (Exhibits Nos. 217 and 218), Limestone (Exhibit No. 219), Madison (Exhibit No. 220), Marshall (Exhibit No. 221), Morgan (Exhibits Nos. 222 and 223), of the State of Alabama to TVA granting permission to erect and maintain over and along their public highways and public places facilities for the transmission, distribution and sale of electricity.

Counsel for complainants offered in evidence and the Court received as Complainants' Exhibits Nos. 225 to 264, inclusive, copies of franchises issued by the Counties of Anderson (Exhibit No. 225), Bedford (Exhibit No. 226), Bledsoe (Exhibit No. 227), Campbell (Exhibit No. 228), Claiborne (Exhibit No. 229), Chester (Exhibit No. 230),

Cocke (Exhibit No. 231), Dickson (Exhibit No. 232), Fayette (Exhibit No. 233), Franklin (Exhibit No. 234), Giles (Exhibits Nos. 235 and 236), Grainger (Exhibit No. 237), Greene (Exhibit No. 238), Grundy (Exhibit No. 239), Hamblen (Exhibit No. 240), Hamilton (Exhibit No. 241), [fol. 308] Hancock (Exhibit No. 242), Hardeman (Exhibit No. 243), Hardin (Exhibit No. 244), Hawkins (Exhibit No. 245), Hickman (Exhibit No. 246), Jefferson (Exhibit No. 247), Knox (Exhibit No. 248), Lawrence (Exhibit No. 249), Lincoln (Exhibit No. 250), Loudon (Exhibit No. 251), Madison (Exhibit No. 252), Marshall (Exhibit No. 253), Maury (Exhibit No. 254), McMinn (Exhibit No. 255), McNairy (Exhibit No. 256), Morgan (Exhibit No. 257), Roane (Exhibit No. 258), Scott (Exhibit No. 259), Sequatchie (Exhibit No. 260), Shelby (Exhibit No. 261), Sullivan (Exhibit No. 262), Union (Exhibit No. 263), Washington (Exhibit No. 264), of the State of Tennessee to TVA granting permission to erect and maintain over and along their public highways and public places facilities for the transmission, distribution and sale of electricity.

Counsel for complainants offered in evidence and the Court received as Complainants' Exhibit No. 265, a copy of the franchise by the Town of Fayetteville, Tennessee, to TVA, granting permission to erect and maintain over and along its streets and public places facilities for the transmission, distribution and sale of electricity to L. N. Gross Company.

[fol. 309] Counsel for complainants offered in evidence and the Court received as Complainants' Exhibit 266 a map of Tennessee showing the counties in the state which as shown by Complainants' Exhibits 225 to 264 have granted electric operating franchises to the TVA.

Counsel for complainants then offered in evidence and the Court received as Complainants' Exhibits 267 to 274 inclusive, copies of the charters of incorporation granted by the State of Alabama to the following cooperatives: Cherokee County Electric Membership Corporation (Exhibit 267), Cullman County Electric Membership Corporation (Exhibit 268), DeKalb County Electric Membership Corporation (Exhibit 269), Franklin County Electric Membership Corporation (Exhibit 270), Guntersville Electric Membership Corporation (Exhibit 271), Marshall County Electric Membership Corporation (Exhibit 272), Joe Wheeler Electric Membership Corporation (Exhibit 273),

Madison County Electric Membership Corporation (Exhibit 274).

The attention of the court was directed to Act No. 45, House 133, Reeder, of the regular session of 1935, of the Legislature of Alabama, and particularly to section 11 of that act, which permits the chartered cooperatives organized under that act, to carry out the powers and duties that would otherwise be granted by the granting of a franchise. That is, it exempts those cooperatives from obtaining franchises.

Counsel for complainants then offered in evidence and the Court received as Complainants' Exhibits 275 to 319 inclusive copies of the following franchises issued by the Counties of the State of Tennessee to the various cooperative associations in that state granting permission to erect and maintain over and along their public highways and public places facilities for the transmission, distribution and sale of electricity:

[fol. 310] Complainants' Exhibit 275, being a franchise issued by Bedford County to Bedford County Electric Membership Corporation.

Complainants' Exhibits 276 and 277, being franchises issued by Bradley County to Meigs County Electric Membership Corporation.

Complainants' Exhibit 278, being a franchise issued by Bradley County to the North Georgia Electric Membership Corporation.

Complainants' Exhibit 279, being a franchise issued by Bradley County to the Bradley County Electric Membership Corporation.

Complainants' Exhibit 280, being a franchise issued by Carroll County to Gibson County Electric Membership Corporation.

Complainants' Exhibit 281, being a franchise issued by Chester County to Madison County Electric Membership Corporation.

Complainants' Exhibit 282, being a franchise issued by Chester County to Pickwick Electric Membership Corporation.

Complainants' Exhibit 283, being a franchise issued by Chester County to West Tennessee Electric Membership Corporation.

Complainants' Exhibit 284, being a franchise issued by Chester County to Southwest Tennessee Electric Membership Corporation.

Complainants' Exhibit 285, being a franchise issued by Coffee County to Duck River Electric Membership Corporation.

Complainants' Exhibit 286, being a franchise issued by Crockett County to Southwest Tennessee Electric Membership Corporation.

Complainants' Exhibit 287, being a franchise issued by Crockett County to West Tennessee Electric Membership Corporation.

Complainants' Exhibit 288, being a franchise issued by Crockett County to Gibson County Electric Membership Corporation.

Complainants' Exhibit 289, being a franchise issued by Cumberland County to Meigs County Electric Membership Corporation.

Complainants' Exhibit 290, being a franchise issued by Dyer County to Gibson County Electric Membership Corporation.

[fol. 311] Complainants' Exhibit 291, being a franchise issued by Franklin County to Duck River Electric Membership Corporation.

Complainants' Exhibit 292, being a franchise issued by Gibson County to Gibson County Electric Membership Corporation.

Complainants' Exhibits 293 and 294, being franchises issued by Gibson County to West Tennessee Electric Membership Corporation.

Complainants' Exhibit 295, being a franchise issued by Giles County to Duck River Electric Membership Corporation.

Complainants' Exhibit 296, being a franchise issued by Hamilton County to Meigs County Electric Membership Corporation.

Complainants' Exhibit 297, being a franchise issued by Hamilton County to North Georgia Electric Membership Corporation.

Complainants' Exhibit 298, being a franchise issued by Haywood County to Southwest Tennessee Electric Membership Corporation.

Complainants' Exhibit 299, being a franchise issued by Hickman County to Duck River Electric Membership Corporation.

Complainants' Exhibit 300, being a franchise issued by Lauderdale County to Southwest Tennessee Electric Membership Corporation.

Complainants' Exhibit 301, being franchises issued by Madison County to Gibson County Electric Membership Corporation, Madison County Electric Membership Corporation, West Tennessee Electric Membership Corporation, and Southwest Tennessee Electric Membership Corporation.

Complainants' Exhibit 302, being a franchise issued by Marshall County to Duck River Electric Membership Corporation.

Complainants' Exhibit 303, being a franchise issued by Maury County to Duck River Electric Membership Corporation.

Complainants' Exhibit 304, being a franchise issued by McMinn County to Meigs County Electric Membership Corporation.

Complainants' Exhibit 305, being a franchise issued by Meigs County to Meigs County Electric Membership Corporation.

Complainants' Exhibit 306, being a franchise issued by Moore County to Duck River Electric Membership Corporation.

[fol. 312] Complainants' Exhibit 307, being a franchise issued by Obion County to Gibson County Electric Membership Corporation.

Complainants' Exhibit 308, being a franchise issued by Obion County to West Tennessee Electric Membership Corporation.

Complainants' Exhibit 309, being franchises issued by Rhea County to "An Association that May Be Set Up to Distribute This (TVA) Power" and to Meigs County Electric Membership Corporation.

Complainants' Exhibit 310, being a franchise issued by Roane County to Meigs County Electric Membership Corporation.

Complainants' Exhibit 311, being a franchise issued by Rutherford County to Duck River Electric Membership Corporation.

Complainants' Exhibit 312, being a franchise issued by Rutherford County to Middle Tennessee Electric Membership Corporation.

Complainants' Exhibit 313, being a franchise issued by Rutherford County to Bedford County Electric Membership Corporation.

Complainants' Exhibit 314, being a franchise issued by Shelby County to Southwest Tennessee Electric Membership Corporation.

Complainants' Exhibit 315, being a franchise issued by Smith County to Middle Tennessee Electric Membership Corporation.

Complainants' Exhibit 316, being a franchise issued by Tipton County to Southwest Tennessee Electric Membership Corporation.

Complainants' Exhibit 317, being a franchise issued by Trousdale County to Middle Tennessee Electric Membership Corporation.

Complainants' Exhibit 318, being a franchise issued by Williamson County to Duck River Electric Membership Corporation.

Complainants' Exhibit 319, being a franchise issued by Wilson County to Middle Tennessee Electric Membership Corporation.

Counsel for complainants offered in evidence and the Court received as Complainants' Exhibit 320 a map of Tennessee showing the counties in the state which as shown by Complainants' Exhibits 235 to 319 have granted one or more franchises to one or more cooperative associations.

[fol. 313] Counsel for complainants offered in evidence and the Court received as Complainants' Exhibit 321 a map of Tennessee showing in red the counties which have granted electric operating franchises to TVA, showing in green the counties which have granted electric operating franchises to electric membership corporations, and showing in purple counties which have granted electric operating franchises to both TVA an electric membership corporations.

"Mr. Fly: I think that I might be permitted to observe that those maps (referring to Complainants' Exhibits 266, 320 and 321) of course do not purport to show the actual operations, and they do not purport to show lines, and as a

matter of fact, the Authority has transmission lines, I think, in about half of those counties, and the only direct operations that are covered, are those that have heretofore been pointed out to the Court. I merely want to make the point the maps indicate franchises and do not indicate these lines.

Mr. S. D. L. Jackson: I think the legend on the map is clearly explanatory of that."

Counsel for complainants offered in evidence and the Court received as Complainants' Exhibits 322 to 325 inclusive, authenticated and exemplified certificates of the Secretaries of State of Tennessee (Exhibit 322), Georgia (Exhibit 323), Mississippi (Exhibit 324), and Alabama (Exhibit 325), that TVA has not taken the steps prescribed by the respective state statutes for foreign corporations to engage in business in the State and that TVA has not designated an agent for service of process within said respective states. (Counsel for defendants conceded that TVA had not qualified to do business in these four states.)

[fol. 314] W. E. WILKERSON was called as a witness on behalf of the complainants and, having been first duly sworn, was examined and testified as follows:

Direct examination:

I am sixty-one years old and reside in Chattanooga, Tennessee. I am a lawyer and have been a city commissioner of the City of Chattanooga. I was elected February 8, 1933, and my term expired, I think, April 15, 1935. During the time I was in office, the City of Chattanooga had an engineering firm, known as Scofield Engineering Company, make a survey and report with regard to whether or not it would be feasible for the city to go into the electric light and power business.

I went to Knoxville with Mayor Bass, Commissioner Eugene Bryan, Commissioner James A. Cash, Commissioner Zack Taylor, and City Attorney J. O. Anderson, and had a conference and negotiations with the TVA. We talked to Mr. Lilienthal concerning the feasibility of putting in

a municipal distribution system, and the probable cost, and the probable income from the system after it had been installed. All of these gentlemen were present with Mr. Lilienthal, and I think Mr. V. D. L. Robinson was present most of the time. As we discussed the matter, the question came up about what percentage of the electrical business in Chattanooga and vicinity we would have to have in order to break even on the investment as then estimated. Mr. Lilienthal said it would take from 50 to 75 per cent of the business in competition with The Tennessee Electric Power Company to break even.

In that conversation Mr. Lilienthal, after stating that it would take from 50 to 75 per cent of the electric business in Chattanooga and vicinity to break even, was asked how [fol. 315] long it would take to get that much of the business, if the municipality put in a distribution system. He said it would take from four to five years. I asked him myself how the city would survive pending this losing period. And Mr. Lilienthal replied, "Tax hell out of them," or words to that purport.

I ask him if that could be done, and he stated that the Supreme Court of the United States had just recently held in the Seattle-Puget Sound case that a municipality could tax a public service corporation, although doing business in competition with it. In this conversation, Mr. Lilienthal said something about the City of Chattanooga being essential to the success of his program or plan of the TVA. Mayor Bass said to him, "You may not want us as a customer," and Mr. Lilienthal said that Chattanooga was one of the key cities and very important that the TVA get it, get a contract with it.

Cross-examination:

Mayor Bass made the arrangements about us going to Knoxville to have this conference with Mr. Lilienthal. I am not sure that the city at that time had made a formal application for a contract with the TVA. There was a great deal of agitation in Chattanooga and vicinity at that time in favor of TVA power and light, and the Mayor and the other commissioners were very solicitous about doing what the people wanted, and went up there to talk to Mr. Lilienthal about the feasibility of a municipal distribution plant for Chattanooga. We did not go up there to get a contract,

because we knew we could get that, but as to the practicality of putting in a system.

The negotiations for the contract continued over a period of time. There was the usual delay in doing business with any Federal agency in my experience. It would go on for months, and nothing be said about it. I don't believe the [fol. 316] contracts were actually signed for some time after that, I think a year or two. In answer to the question whether I know that the City Council and Electric Power Board had applied for that contract long before they got it, the matter of making actual application for the contract was handled through the mayor, and I am not personally familiar with just exactly when that was done. I do not know when the contract was finally executed. I think it is right to say that the contract was not signed until within the last 12 months. That is my hearsay information. This conference I mentioned took place on a warm day in the spring, summer or perhaps fall of 1934. I was a member of the Board of Commissioners in October, 1933.

The document (offered and received in evidence as Defendants' Exhibit 4) is a copy of a Resolution of the Board of Commissioners of the City of Chattanooga, adopted under date of October 24, 1933, and is I presume, an accurate copy of the Minutes.

The letter (offered and received in evidence as Defendants' Exhibit 5) dated October 3, 1933, and addressed to the Tennessee Valley Authority, attention Mr. Lilienthal, appears to bear the signature of Mayor Bass. I am well acquainted with Mayor Bass and in my opinion the signature on this letter is his signature. (Defendants' Exhibit 6, being a carbon copy of a letter, dated October 9, 1933, addressed to Mayor Bass in answer to his letter, Defendants' Exhibit 5, was offered and received in evidence without objection.) This is the first time I ever saw this exchange of letters.

Redirect examination:

I am not so definite about the dates but the negotiations which we had in Knoxville with Mr. Lilienthal were probably in April, 1934. I am sure it was 1934 and it was probably April.

(The witness was excused.)

[fol. 317] J. O. HENKLE was called as a witness on behalf of the complainants and, having been first duly sworn, was examined and testified as follows:

Direct examination:

I am 48 years old and reside in Huntsville, Alabama. I am manager of the northern division of the Alabama Power Company.

The map (offered and received in evidence as Complainants' Exhibit 326) shows the territory of which I am division manager. The area marked off with cross-hatching is included in the territory of which I am division manager. It is the area within which certain lines were conveyed to the TVA by the Alabama Power Company. We have some operations in that territory, including urban distribution systems and some transmission lines which are under my direction. I am generally familiar with the electric power facilities which are located in this territory. This map shows the main distribution and transmission lines in the territory, but it does not show the urban distribution systems, or some short rural tap lines, as it would be impossible to show those on a map of this size.

The lines in yellow on this map represent the transmission and distribution lines of the Alabama Power Company. In this area at the present time the Company owns and operates 375 miles of transmission lines of voltages of 154, 110 and 44 kv., 1700 miles of distribution lines of voltage of less than 13,000 volts, and 1038 miles of rural lines.

The lines in red on this map represent distribution lines receiving service from the TVA and they were constructed by the TVA. The lines shown in red with cross-hatching represent the lines acquired by the TVA under the January 4, 1934 contract and it is my understanding that they have subsequently been transferred by the TVA to some rural cooperative or municipality.

[fol. 318] The lines in purple represent the lines, transmission and distribution system, of the TVA. The broken line through Jackson County represents a line that, according to my best knowledge, will be constructed between Guntersville Dam and Chickamauga Dam. To the best of my knowledge, it has been surveyed, but I do not think it is under actual construction.

With reference to the general character of the area which comprises my district, this territory is, I would say, largely a farming area. The principal towns in the area are Decatur, Huntsville and Florence—Decatur having a population of about 16,000, Huntsville a population of about 12,000, and Florence a population of about 12,000. In the vicinity of these towns and of some of the smaller towns, there are a number of industries, principally textile mills. In the eastern part of this territory, the land is somewhat hilly, more so in northwest Jackson County. Further west the land becomes rolling, and then again somewhat hilly in the western part, mostly in Colbert and Franklin Counties. I would say that the richest farm lands in the state are the bottom lands along the Tennessee River. That is the most highly developed agricultural section.

Our operations in the so-called ceded area are indicated on the map by filled-out yellow circles, and by yellow lines to indicate transmission and distribution lines. The town of Guntersville is located in Marshall County. That is one of the municipalities which has elected to acquire its own distribution system and transmit or distribute TVA power. Substantially all of the materials required for building that distribution system are on hand in the town of Guntersville, and work was actually started on the construction of the system. At the present time, however, the Alabama Power Company is still serving all of the customers in the town of Guntersville.

[fol. 319] The Alabama Power Company maintains 226 field employes under my direction as division manager in this territory. We have made continual studies of the unattached business of all kinds in this territory. It is a specific duty of the managers of the nineteen local offices in this territory, with their assistants, to continually canvass the unserved business in these areas and report such findings to the division office.

The character and extent of the unattached electric industrial power business in this district is as follows: There are three industries which use steam for processing purposes. The largest of these is a mill in Huntsville, Alabama, that at present purchases from my Company about 2/3 of its power for use in the mill, and uses about 1/3 of by-process steam power at the present time. However, as this mill is being re-conditioned, electric service is being

installed. The other two are cottonseed oil mills that use steam for processing, and they also use Alabama Power Company's service for lighting and for some auxiliary power. Then there are thirteen cotton gins, all scattered throughout the area, that have their own power units in the form of steam or oil, or farm tractors for operation. Of course, this is a seasonal load and operated intermittently, depending on the cotton crop. Then there are seven saw mills or wood working plants in the area which have fuel as a by-product in the form of sawdust or wood slabs, which makes their fuel cost very low, or probably no cost, and these plants have their own units. And there are two small ice plants using oil engines. All of these last-mentioned plants, except two, use Alabama Power Company's service for lighting and miscellaneous power service. All of the industries mentioned are on our existing lines and could be readily served at any time if they desired to abandon their present power units, which are of some value to them, and [fol. 320] it is doubtful if they would consider abandoning these units at this time.

There is no substantial unattached commercial demand in the territory. There are, of course, some stores and filling stations located in remote sections at cross-roads, and probably a few scattered grist mills that operate only about one day per week, and take in toll about one-eighth of the grain that is ground as payment for the service. They use second-hand gasoline engines for power and some discarded automobile engines, some farm tractors, most any kind of equipment.

The unattached domestic demand within reach of existing Company lines in this territory is of a very low income group of homes, and most of them are tenant homes or negro homes. In the case of tenants, of course, the landlords will not wire them for service, and I would say in most cases the people just cannot afford electric service, under the minimum requirements of the Alabama Power Company, which are \$1.25 for rural and \$1.00 for urban service. These amounts would provide lighting service for the people. There are about 3500 unserved houses in this territory within reach of existing Company lines, and I might say that only about 50% of the homes on existing lines are present customers. I am referring to lines outside of the corporate limits of towns in this territory.

The unattached potential domestic demand beyond the reach of existing Company lines as now extended, is very scattered. In fact, nearly all of the communities in this territory where there is a concentration of more than four or five or six houses now have service available. This potential unattached demand is of the lowest economic class, and would generally fall in the same group as those homes along the existing lines which do not now take service even though it is available.

[fol. 321] I am familiar with the minimum requirements of the TVA rural cooperative or neighborhood plan. Under that plan there must be 662 kilowatt-hours contract demand per mile of line. From my knowledge of the territory and the studies or surveys which have been made by the Company there is no unattached domestic demand now existing in this area which at the present time can be served under that plan. I am familiar with the minimum requirements of the Alabama Power Company and there is no unattached domestic demand that could be served under those minimum requirements at the present time.

Referring to the map, Complainants' Exhibit 326, those lines in Cullman County, to my knowledge, are operated by the Cullman County Electric Membership Corporation. That system of lines could be served by the existing facilities of the Alabama Power Company in the area. I would call attention to the yellow lines in Cullman County, which are the Alabama Power Company lines, and the construction of these lines of the same type and voltage of the Cullman County Electric Membership Corporation lines, which lines could be served directly from the Company's existing lines in this territory by merely inter-connecting the lines. The green line in the upper lefthand corner of the map, to my knowledge, is owned by the Southern Tennessee Power Company.

The city of Sheffield is shown on the map a little southwest of Wilson Dam, and is the center group of this cross-section just west of the dam. Its name however does not appear on the map. The Company is rendering service to the city of Sheffield at the present time. However, the city of Sheffield is now constructing an electric distribution system and they are serving some business with power from the TVA, and as the distribution system of Sheffield is being constructed as the city's work progresses, the Alabama

Power Company's system is being torn down. The distribution system of the Alabama Power Company in Sheffield [fol. 322] field was not conveyed to the TVA or to the city of Sheffield. The population of the city of Sheffield is about 6000. The franchise of the Alabama Power Company in the city of Sheffield expired in 1932, prior to the construction of the city's system.

Cross-examination:

It is true that at the time the city of Sheffield began to construct its own distribution system, the Alabama Power Company was simply in the city of Sheffield under an expired franchise, but we offered to sell our system to the city of Sheffield for about \$180,000 and to accept in payment the City's 4% bonds and they declined that offer and issued \$294,000 worth of 4½% bonds.

I am generally familiar with the properties that were conveyed by my Company to the TVA under the contract of January 4, 1934. Those properties were located in the Counties of Colbert, Lauderdale, Lawrence, Limestone, Morgan, the north half of Franklin and just a little segment in the northeast corner of Cullman. I can not tell you the area in square miles that was covered by the lines that were conveyed under that contract as I do not have that information. I would say that the total population of that area was about 215,000, to the best of my knowledge. The total number of customers that were served by the lines that were conveyed by the Company to the TVA was approximately 1000. I think there were about 48 industrial customers who were served by those properties. The industrial load transferred was approximately 5000 kw.

It is my understanding that the contracts for industrial service in that area were assigned to the TVA under the contract of January 4, 1934. About 130 miles of 22 kv. or over transmission lines were conveyed under that contract. About 200 miles of rural lines were conveyed under that [fol. 323] same contract. Those rural lines were serving both rural business and some small towns or communities. They were serving Rogersville, which is an incorporated town. Some substations were transferred under the terms of that contract. I don't know the number of substations transferred, but I guess they are shown in the contract.

The Alabama Power Company is now serving the towns of Leighton, Cherokee, Town Creek, Courtland, Hartselle, Falkville, and Moulton within the ceded area; also Sheffield, Russellville, Decatur, and Austinville. We are serving Cherokee, Town Creek and Courtland from the substations transferred to the TVA under the January 4, 1934 contract. We are not using the substations that we conveyed to the TVA in order to serve those towns, but the service is being rendered through those substations.

I believe that the TVA has transferred the lines acquired under the contract of January 4, other than the main trunk transmission lines connecting the dams, to some county corporations. I have no direct knowledge of it, but I understand that to be a fact. I believe it is correct that there are no transmission lines outside of the ceded area owned and operated by the TVA except the main trunk transmission lines connecting the dams.

I know there have been some additions to the rural lines that were conveyed within the ceded area. The total number of miles of rural lines now in that area is about 935, to my best knowledge. The number of miles conveyed under the contract of January 4, 1934, was about 200. The total number of customers served from those rural lines now in existence in the ceded area is about 4100. The total number of customers served by the lines conveyed under the contract of January 4, 1934, was about 1000.

[fol. 324] To my best knowledge, the lines shown in red in Cullman County and the eastern part of Winston belong to the Cullman County Electric Membership Corporation. I don't know exactly how many miles of rural lines my Company owned and operated in Cullman County prior to 1935 but we had the lines that came into Hulaco and into Bailey-town up in the northeastern part of Cullman County. That line went up to Holly Pond prior to 1935. It is correct that the rest of it as shown on the map has been built since 1935, but I would like to say that all of that territory was surveyed and lines projected for that section in 1928 or 1929, and the depression came along and held up that program until the depression was ending, at which time we resumed that program and were able to go ahead and get some of the business.

Prior to 1935, the line coming down into Cullman County from Eva and Vinemont came up to as far as Vinemont,

and then as I recall extended south from Vinemont for a short distance. Not all of that extension that is now shown on the map was there before. A short part of the extensions branching off from that line just above Vinemont, one of them branching off towards the west and the other towards the east, was constructed prior to 1935. I would say about one-fourth of that line, as near as I can tell from the map, but I would like to say this, that that business was signed by the Alabama Power Company and the line was under construction, and the TVA with their full crews came into the territory and started to parallel that line and in some cases interfered with the construction of that line. And I would like to say further that the closest source of power to those lines that the TVA was constructing to block that construction of our line was about 12 miles.

Referring to the line in the southern part of Cullman County to White City, not any of that line was constructed [fol. 325] prior to 1935, but the line south of there to Hanceville and all that section, and east of Hanceville over to Steppville, which is shown by a small circle, had been constructed. Not all of the extensions that appear on the map east of Hanceville were constructed prior to 1935, but we had a short line running out of Steppville, which is the second circle east of Hanceville, probably three-fourths of a mile. A short line of a mile and a half out of Hanceville north in Cullman was in operation in 1935. I couldn't except by scaling the map give the total number of miles of rural lines that the Company had in Cullman County prior to 1935. I wouldn't say that 38 miles would be somewhere near right. I don't know whether we had more than 38 or not, and I wouldn't know unless I scaled the map. As I recall, there were in the neighborhood of about 120 customers which we were serving off of those lines in Cullman County prior to 1935. I do not know of any such rural customers that were located in towns of a population of more than 200 except Hanceville.

I do not know the total number of miles that we have built in Cullman County since 1935. I would not say that the figure of 85 miles built since 1935 seems right. I would not like to say unless I knew definitely whether it is that many or more than that. In Cullman County we have built more miles of lines since 1935 than we have built in all of the other years we have been in existence. It is true that

since 1935 we have extended our lines into areas where we have never had lines before, but I would say that our system was in those locations, that all business came to a standstill about 1930, and that it was impossible to get any rural business during the period of the depression. This is a small county. The average number of customers that we have on these new extensions in Cullman County, the ones we have made since 1935, is, according to my best knowledge around 5 per mile. I can give the figures as to density and can not give any figure as to number of miles or number of customers, for the simple reason that the density [fol. 326] figures are figures that are average for our system in that area and practically all our system. I could give you the number of miles and number of customers if I had time to check the figures. In answer to the question whether the density would be just slightly over three customers to the mile on those new extensions, I would say that the density is greater than on the TVA lines in that County.

According to my best knowledge, the Cullman County Electric Membership Corporation has 240 miles of lines in operation in Cullman County. The number of customers served by that cooperative is about 865. According to my best knowledge, there are three customers that are now being served by the Cullman County Electric Membership Corporation that were formerly served by my Company in that area. I would call a customer a premises which is connected to our lines and where one family moved out and another moves in immediately. It is true that there are different people. It is true that there are not the same people in any instance who were formerly served by our Company but I would like to say that one of them is a director of the Cullman County Electric Membership Corporation.

Before my Company undertook these new extensions in Cullman County, we did not make any study or investigation to see how many of the customers along the route that we were proposing to go had already signed applications with the Cullman County Electric Membership Corporation. We were not interested. We were interested in getting them to sign our contracts. In answer to the question [fol. 327] whether we did not care whether prospective customers were already signed up with someone else just so

we knew we were going to build a line, I think I would agree that what we were interested in was to get the new customers signed.

I do not know how many people along these extensions built since 1935 signed contracts before we built the lines. We could produce some signed contracts that we procured along these new extensions before they were built, but I do not know how many. I have none with me. In answer to the question whether I can name any customer we signed, I do not remember the list of customers, because those lists came to me and I did not scrutinize them carefully enough to remember the names of the customers.

The communities marked on the map of this area in Cullman County, West Point, Jones Chapel, Logan, Crane Hill, Trade, did not have any electric service prior to 1935. None of the line down in the southern part of the County, running to Arkadelphia, was constructed prior to 1935. Judging from the scale of the map, I would say that line is about 12 miles long. I do not know how many customers we have along it.

Redirect examination:

Referring to the line extensions in Cullman County which I testified were constructed since 1935, there were requests for those line extensions prior to the construction of such lines.

(The witness was excused.)

[fol. 328] HERBERT J. SCHOLZ was called as a witness on behalf of the complainants and, having been first duly sworn, was examined and testified as follows:

Direct examination:

I am 45 years old. I reside in Birmingham, Alabama, and for the past 6 years have been in charge of the southern engineering staff of The Commonwealth & Southern Corporation of New York. I graduated in 1915 from Leland Stanford University in electrical engineering, and except for a period of 15 months while in the military service, I have been continuously associated with the business of power generation, transmission and distribution of electrical energy.

The map (offered and received in evidence as Complainants' Exhibit 327) shows within a radius of 100, 150 and 250 miles of any TVA dam now constructed, or which it has under construction, or which it has authorized or recommended for construction, the transmission and distribution lines of the complainant companies other than the distribution lines located within communities or municipalities, or which are so short that the scale of the map would not permit them being shown. The lines of the complainant companies, except for the Kentucky-Tennessee Light & Power Company, were taken from several smaller maps filed in this Court as Complainants' Exhibits 7, 12, 27, 29, 33, 37, 41, 49, 74, 82, 89 and 101, and were transposed to this large map. The map also shows the principal transmission lines of private utility companies, not complainants, located in this area.

In accordance with the legend, the lines of the smallest [fol. 329] width represent lines below 15 kv.; the lines having intermediate widths are lines between 15 and 50 kv.; and the lines of the broadest width are lines of 50 kv. and above. The map correctly shows the lines as they are shown on the smaller maps that I have referred to as exhibits heretofore filed in this case, except for the difference in scale. The voltage and transmission lines of the Kentucky-Tennessee Electric Power Company have been indicated on this map as number 11. There are no other lines of the Kentucky-Tennessee Electric Power Company except those which are in communities and municipalities. The lines in communities and municipalities are too small to show on a map of this scale. The map correctly shows, so far as I am able to state, the location and voltage of the principal transmission lines of non-complainant companies within the 250 mile area. The non-complainant company lines are all located in areas which have no colored background in Arkansas, Missouri, Illinois, parts of Indiana, Ohio and Kentucky and in the southeast, North Carolina, South Carolina and parts of Georgia.

The boundary outline of the colored background, in so far as the Alabama Power Company, The Tennessee Electric Power Company, the Appalachian Electric Power, the Kentucky & West Virginia Power Company, and the Kingsport Utilities Company, Inc., was taken from the smaller maps filed in this Court as Complainants' Exhibits 7, 49

and 89. As regards the other complainant companies, the colored background has been placed to show the ownership of lines. That is to say, as to the companies other than those I pointed out, the maps filed as exhibits do not have this colored background, but I have placed it on there in [fol. 330] making this map. The purpose was to show ownership of the lines, and to be consistent I merely outlined the boundary, and colored the background which covered the lines of that particular company in one color.

Cross-examination:

The purpose of showing the tinting was to indicate the ownership of the lines. The ownership of lines could be represented possibly in other ways. With reference to showing ownership by coloring the lines themselves it would take a great number of colors to do that and from a map-making standpoint it would still be difficult to use changes in colors in the different areas, because of the color of the present lines being in blue, this being a white print; or if it were a blue print, with white lines, it would be difficult to merely trace over the lines sufficiently to show that. However, it would be feasible to make a map coloring the transmission lines.

"Mr. Fly: If your Honor please, I will object to that map, on the ground that it is unnecessarily and prejudicially misleading. This is a system that these complainants have insisted upon adopting from the very outset of this case, and by adopting a solid color scheme, covering general areas, regardless of what the type of line was, and type of service and availability is, they carry forward there the impression that all of these territories are territories that are peculiarly under the domain of those particular companies.

Now I don't think that we ought to perpetuate in the record any such misleading and prejudicial exhibits. Now then they have had ample notice of that, and I think it is time that we were getting a fair method of setting forth those lines."

[fol. 331] Examination by the Court:

The dams are not shown on this map but their location would be represented by striking radii from the arcs of these circles 150, 250 or 100 miles, which would intersect

at the dam location. I was not here the other day when the court commented on a map which referred to a dam recommended for construction. Fontana Dam is the only dam which has not been authorized by Congress which would have any bearing on the circles.

Cross-examination continued:

I have not indicated the location of any of the dams as such except it could be derived by striking the radii from the arcs of the circles.

"Mr. Fly: May it please the court, following through on your Honor's question about the dams, the witness has testified Fontana Dam has been used as a center. The dams themselves are not shown on there, and as the witness has testified, the only way to find what dams are concerned, and therefore to arrive at some idea as to when this sort of thing would be possible from the standpoint of construction, whether or not the dam is built, whether or not the dam is under construction, whether or not it is authorized, there is no way to spot those on there in relation to this work except by taking the 250 mile radius and working back from the circumference.

And I think also the fact that after a week's notice they have brought Fontana Dam in here again also makes the map both misleading and prejudicial, and upon all of those grounds, including the improper coloring of the background, I object.

Judge Allen: Mr. Fly, is there any other dam except Fontana Dam which is recommended by the TVA Board but not authorized by Congress?

Mr. Fly: I don't believe that any other dam is recommended and not authorized, your Honor, and as a matter of fact there is no pending recommendation to Congress on the Fontana Dam. It was, a year or two ago it was recommended but was rejected at that time. And it has not been recommended since.

Judge Allen: The objection of the Authority to the use of the distinctive colors on this map, for the purpose of indicating territory through which certain transmission [fol. 331a] and distribution lines of various companies past, is overruled.

The Authority has the right to cross examine on those points, and bring out the facts. The Court considers that

the map in its present condition is incorrect and misleading. It refers to dams but it does not include the dams. And also, the Court, in accordance with its previous ruling, under which it admitted an exhibit which it deemed incorrect and inaccurate, the Court rules that the dam which has been recommended but not authorized by Congress should not be included."

[fol. 332] (At a subsequent session of the Court the witness H. J. Scholz was recalled.)

Direct examination (continued):

Under my direction we have added to the map (Complainants' Exhibit 327) the following dams and dam sites indicated on the map as follows: "Gilbertsville Dam, Pickwick Landing Dam, Wilson Dam, Wheeler Dam, Gunter'sville Dam, Chickamauga Dam, site of Watts Bar Dam, site of Coulter Shoals Dam, Norris Dam, Hiwassee Dam, site of Fontana Dam recommended." The word "recommended" is also added after the site of Watts Bar Dam and likewise after Coulter Shoals. In addition to that, we have added notes to the arcs of the circles to show which particular dam that arc has reference to. In addition to that, there was some error in showing coloring south of Chattanooga in the northern part of Georgia, and we have restricted the colored area in that locality to around the lines owned by The Tennessee Electric Power Company in Georgia. Outside of that, it is identical with the way it was presented originally. We eliminated some of that pink area from the northwest corner of Georgia under instructions from our attorneys to the effect that it was to be made to conform to the testimony of Mr. Guild.

Cross examination:

So far as the wording on the map is concerned there is no distinction between Watts Bar, Coulter Shoals and Fontana. They are all marked "Site of — Dam, recommended". So far as the map is concerned, we have placed [fol. 333] them in the same status. (The Court suggested that the words "No specific Congressional Appropriation yet made" be added under Fontana. This correction being made the map, Complainants' Exhibit 327 for identification, was received in evidence.)

I have not shown the generating plants and substations on Complainants' Exhibit 327 and I have not shown any difference between the various transmission lines of 50 kv. and above. In accordance with the legend, we divide the voltage classes into three classes, and there was no distinction made trying to classify any further the lines of 50 kv. and above. The practical difference between a line of 66 kv. and 154 kv. is in carrying capacity, depending upon the conditions, length of line, power factors, etc. Assuming the same conditions the carrying capacity of a transmission line increases as the square of the voltage, so that the carrying capacity of a 110 kv. line would be in the order of four times as great as the 66 kv. line. Similarly, the capacity of a 154 kv. line is about 6 times that of a 66 kv. line.

The TVA lines are not indicated on the map. They were not intended to be. We have shown the dams, however, and the lines of all of the companies, including the Complainants, that reach the dam sites. The line which runs from Arlington, near Knoxville, to the vicinity of Norris Dam, is owned by The Tennessee Electric Power Company. There are no other lines in that same proximity in the vicinity of Norris Dam, to the best of my knowledge, other than Government lines. The lines that are shown on the map in the vicinity of Chickamauga, but not connected to Chickamauga, are those of The Tennessee Electric Power Company. No other private utilities that I know of have any lines in that immediate vicinity. I understood at one time The Tennessee Electric Power Company had a connection at Chickamauga Dam site for construction purposes. [fol. 334] But whether that is actually there now, I couldn't say. There are no private utilities other than Alabama Power Company, to my knowledge, that have any transmission lines leading from the vicinity of Guntersville. I don't believe there are any lines of private utilities leading from Wheeler Dam. The only lines that are in that vicinity, other than those of the TVA, are lines that were previously owned by the Alabama Power Company. The Alabama Power Company has a connection to Wilson Dam. The Southern Tennessee Power Company also has a connection at Wilson Dam. It is another subsidiary of The Commonwealth & Southern Corporation. The function that that Company has been performing has been to own a little stretch of transmission line leading from the Wilson Dam

into the territory of The Tennessee Electric Power Company. I do not know of any other function that it performs other than to own and operate that one line. There are no lines of any other private utility in the vicinity of Wilson Dam.

The closest line of a private utility in the general vicinity of Pickwick Landing Dam would be that of The Tennessee Electric Power Company extending southwest from a point to Centreville, or near Columbia, that line that extends to the southwest, the nearest line.

The first interconnection between the Alabama Power Company and the Mississippi Power Company is one of 44 kv. on the West Point-Aberdeen-Sulligent line. That is the northernmost line running east and west across the boundary. The next one is the 110,000 volt interconnection at the state line, being an east and west line extending from [fol. 335] the vicinity of Birmingham, actually at Gorgas Steam Plant, to West Point, Mississippi. The next interconnection between the Mississippi and Alabama companies is at the state line between Demopolis, Alabama, and Meridian, an east and west line between those two stations or cities. There is another interconnection at the state line, at the extreme southern part of the territory at the state line, an east and west line between Mobile and Gulfport, Mississippi. The Mississippi Power Company has been taking a substantial part of their power requirements from the Alabama Power Company over those lines. It has been doing that for several years and is now doing that.

In the northeastern part of the state of Alabama at a point north of Bridgeport, there is a 44 kv. interconnection between the Alabama Power Company and The Tennessee Electric Power Company. Outside of that, there is no direct interconnection that I can think of at the moment between the Alabama Power Company and The Tennessee Electric Power Company. At the present time, the function of the line belonging to the Southern Tennessee Power Company is to connect through other facilities the Alabama Power Company and The Tennessee Electric Power Company. To the best of my knowledge, that is the only function that it performs at the present time. The line is the equivalent of 250,000 circular mills copper, and part of the section is equivalent to 3.0 copper. In terms of kilowatts it is a 154 kv. line.

I think there has been power transferred in recent years between the Alabama Power Company and The Tennessee Electric Power Company, but I am not qualified to answer whether it was chiefly from the Alabama Power Company to The Tennessee Electric Power Company.

[fol. 336] By Mr. Fly:

"Q. You do know that The Tennessee Electric Power Company, particularly in low water seasons, is in need of power and it relies upon the Alabama Power Company to get the power over those lines, don't you?

Mr. Seymour: Just a moment before you answer that.

Mr. Fly: Are you objecting?

Mr. Seymour: I want to object if you will give me the opportunity. If the Court please I would like to recall to counsel the fact that we are taking the position that this is outside of the appropriate scope of the direct examination of the witness and going into matters that it is evident he does not know anything about. We are perfectly willing, if the Court please, that he be examined about things, this map, and the testimony, that it is evident he could give, and about which it is proper to go into the record. This is purely argumentative.

Mr. Fly: This is not argumentative. I want to know whether over that line——

Judge Allen: Let the Court make a statement. In addition to the reasons heretofore given for extending the scope of cross examination, acting deliberately and unanimously, taken after a very careful consideration, the Court now is certain that so far from abusing its discretion, it was compelled by the circumstances of the case to allow cross examination beyond the scope of examination in chief.

We are bearing in mind this fact, that if cross examination were limited, as it is strictly limited under the general Federal rule, without opportunity for further cross examination, as held in *Davis vs. Koblentz*, 174 U. S., the Court considers if the witness had been held to strictly or so strict a cross examination, and then having to be recalled for matters, that this case, which it seems should be terminated by Easter certainly would have lasted until June. At least we feel a substantial gain in time has been made by refusing to abide by our federal rule.

There is another point on which the Court desires to take counsel into its confidence, that is we do not think this is an ordinary case where counsel on either side are uncertain as to what will be testified. The facts in this case have been subject to judicial scrutiny, almost every fact, frequently. They have been repeatedly in the State courts, in the different states, repeatedly in the federal courts in the different states. The result is that counsel for neither litigant can conscientiously say they do not know what will be [fol. 337] brought out on the other side. Therefore they are not subject to surprise which is the real reason for the rule on cross examination both in the State courts and the Federal courts. We feel that the facts have been so sifted, that the prejudice which might result in the ordinary case does not exist here, and we want counsel to understand that.

Mr. B. T. Jackson: May I make an objection for the record, if your Honor please? We object to this question because it has no relation to examination in chief, and wish to state the reason we make the objection, in view of what we recognize to be the ruling of the Court. We recognize that the court may exercise wide discretion over the order of procedure and that sort of thing, in the mechanics of the trial for the convenience of the Court as well as of the parties. But we do not understand that that includes any infringement of the substantial rights of the parties under these rules of examination and cross examination.

And our understanding of the rule is when a party goes into other phases on cross examination, he makes the witness his witness. He is not permitted to ask leading questions, and the other side has the right to cross examine on those points. But, while the Court may hold that the witness may be examined by the other side, if they want to use him for some other particular matter while he is on the stand, and put in a part of their case somewhat out of order, we do not understand that includes relieving the adversary of his usual obligation that he makes the party his witness, and is required to abide by the rules that the Courts follow, that the witness is his witness and his adversary has the right of cross examination.

Judge Allen: As we understand the rule we are following here, the rule was laid down in Davis vs. Koblentz.

Mr. Jackson: May we now note objections to the rule of the Court that counsel for the defendant is entitled to the privilege of taking such matters outside of the direct, with-

out making the witness his own witness and giving us the right of cross examination.

Judge Allen: You may have the exception."

There is doubt in my mind that The Tennessee Electric Power Company, particularly in low water seasons, is in need of power and relies upon the Alabama Power Company to get the power over those lines.

[fol. 338] "Q. You know Mr. Guild testified that he bought substantial blocks of power through that line leading to Wilson Dam, don't you?

Mr. Seymour: We object to that for the same reason.

Judge Allen: Overruled.

Mr. Seymour: Exception.

A. It may be that substantial quantities of power may have gone over the line, but I do not think it is a fact that that would necessarily be the dry season. You made the statement."

In balancing the amount of power The Tennessee Electric Power Company delivers to the Alabama Power Company against the amount of power it gets through that line from the Alabama Power Company, I would say that in the final balance The Tennessee Electric Power Company is the purchaser.

"Q. Are you familiar with the amount of power that those Commonwealth & Southern Companies have taken through this line shown on your map, from the TVA dams as shown on the map.

Mr. Seymour: Objection for the reason just stated.

Judge Allen: He may answer.

Mr. Seymour: Exception.

A. I am not familiar with the amount of power that has been taken.

By Mr. Fly:

Q. Do you know it has been a substantial block over a period of years?

Mr. R. T. Jackson: Permit me again——

Mr. Fly: Let the witness answer. Don't interrupt the witness.

Judge Allen: He may answer.

Mr. Fly: Do not interrupt the witness.

Judge Allen: Do not have argument between counsel. Make your objection and let the Court rule.

Mr. R. T. Jackson: May I state my exception to the refusal of the Court to permit me to state the ground?

[fol. 339] Mr. Fly: Will you answer?

A. In the quantity."

I am familiar by general knowledge with the connections of transmission lines between the various dams shown on the map.

"Q. And you are aware of the fact, are you not, that the Norris and Wheeler dams are interconnected with Wilson Dam?

Mr. Seymour: Objection to the question.

Judge Allen: He may answer it.

Mr. Seymour: Exception to the ruling.

A. By hearsay, yes; not by actual knowledge."

I cannot say when I first heard that. I could not tell you who told me. I think where I heard it probably was in the press. In answer to the question whether I saw the announcements when Norris started operation and all that sort of thing, I would say from general knowledge, yes.

I did not, to my knowledge, talk about that matter to Mr. Duryea, nor did I have any communication with Mr. Neeson, of the Alabama Power Company, or Mr. Miller, of The Tennessee Electric Power Company. I am the head of the Southern Engineering branch of The Commonwealth & Southern Corporation and am in close touch with those gentlemen on certain matters. Depending upon what the problem is, I am in close touch with those gentlemen in important matters involving the transmission system in the Commonwealth & Southern area. I am primarily handling engineering matters. I have no recollection that Mr. Neeson, of the Alabama Power Company and Mr. Miller, of The Tennessee Electric Power Company, inspected Norris Dam when it began operation about the first of August, 1936. I have no recollection that I heard from those gentlemen or from anyone else at that time that they did inspect that dam [fol. 340] and power plant then. No one told me that there

was any inspection being made. I have heard since that people have visited Norris Dam.

By Mr. Fly:

"Q. And you have heard that those engineers of those two companies were appointed as a Committee for the Commonwealth & Southern System to inspect that dam at that time, were they not?

Mr. Seymour: We object to that question.

Judge Allen: Objection overruled.

Mr. Seymour: Exception.

A. I was not informed about that point.

Judge Gore: Mr. Fly, do I understand you are trying to show the Wilson Dam and Norris Dam, and Wheeler Dam are connected by transmission lines; is that it?

Mr. Fly: I am trying to show, of course, what everybody here knows as a matter of fact, that Norris, Wheeler and Wilson are interconnected, and that those dams were put into operation beginning in July, around the first of August, 1936, and that they had no possible outlet for the power except to go on to the system feeding out through Wilson Dam, and that all of that power was in one common pool. And eventually I will put in the documentary evidence from these gentlemen which will prove that they knew that the power was going into that pool and coming out to them. I think that every witness who gets on this stand, every qualified engineer in this field, ought to meet that issue squarely and testify to it. I think that their knowledge of it is so extensive they ought to meet it squarely. In fact, I think counsel ought to stipulate.

Judge Gore: What I have in mind is this a physical connection, visible to the eye, or to be seen? Gentlemen, it looks like those transmission lines, if they are connected, that matter could be stipulated. Then the other matter concerns what I have got in mind now, because I could go there, I could see the lines if it is a physical connection.

Mr. R. T. Jackson: We raise no question, in fact we expect to prove the dams are interconnected by transmission lines with the other dams.

Mr. Fly: And that they are in one pool.

[fol. 341] Mr. R. T. Jackson: That they are now, and are all going to be in one pool, and also as I stated before, it is

just the beginning of your big grid system. It is one pool of power. We are ready to stipulate we have proved in the record by Mr. Barry that there has been a connection since before TVA was formed, with Wilson Dam and the Alabama Power Company system, and that the only power the Alabama system ever received, to go out through its system, to the Commonwealth & Southern companies was through the connection at Wilson Dam.

Q. Did Mr. Willkie ever tell you that he understood that Norris and Wheeler Dams were placing power on the lines leading to Wilson Dam, and connecting with the lines of the Commonwealth & Southern Corporation.

Mr. Seymour: Objection made to that question for the reason just stated above.

Judge Allen: Objection overruled. You may have your exception.

Mr. Seymour: Exception.

A. I have no such recollection, Mr. Fly.

By Mr. Fly:

Q. Did Judge Weadock ever tell you?

Mr. Seymour: Objection.

Judge Allen: Did anyone ever tell you anything about that?

A. I have no such recollection of anyone telling me that."

I do not have the figures for the total installed capacity connected with the transmission lines of the southern Commonwealth & Southern companies, as of January 1, 1937, but I can secure them.

By Mr. Fly:

"Q. With the Court's permission I will ask the witness to verify these figures: Installed hydro capacity, southern branch of Commonwealth & Southern as of January 1, 1937, 833,016 kilowatts; dependable hydro capacity for the same system 529,370 kilowatts."

[fol. 342] (The following testimony of the witness was subsequently incorporated in the record as a part of the cross-examination;)

The figure of 833,016 kilowatts mentioned by Mr. Fly is not the installed hydro capacity of the southern properties of The Commonwealth & Southern Corporation as of January 1, 1937, but was reported to Federal Power Commission as the hydro plant capability at the time of the 1936 system peak (kilowatt).

The sum of the installed hydro capacities in kilowatt name plate rating, reported by the operating companies comprising the Southern group of the Commonwealth & Southern Corporation, in column 3, page 6, as of December 31, 1936, in their statement on the production, transmission, and utilization of electric energy for the years 1934, 1935, and 1936 is 867,717 kilowatts.

The figure of 529,370 kilowatts mentioned by Mr. Fly as being the dependable hydro-capacity, agrees with the figure in the supplementary statement accompanying the above mentioned statements of the individual companies, on page 9, paragraph 4, in accordance with the Federal Power Commission's definition of the term, and with stipulated conditions as set forth in their questionnaire, and as qualified by the explanatory note of the reporting company referring to page 9, item (a).

[fol. 343] Redirect examination:

The map, Complainants' Exhibit 327, was not prepared or made for the purpose of showing the generating stations and substations. It was made purely to show, as appears by the subject of the title, transmission and distribution lines, the ownership of those lines, and voltages of the three different types of lines. The map did not purport to show the connections of certain lines with TVA dams or Government dams, but to show conditions within certain radial distances from those dams as focal points. The map was not intended to show physical connection with the Government dams and there is no symbol to indicate any physical connection at that place. It was made to show the lines of the private utility companies and of the location of the TVA dams or dam sites if they happened to fall inside of the line representing a line of a private utility. There is no symbol on the map to show any interconnection with any other companies. There is merely a continuation of the line into a different colored area.

(The witness was excused.)

[fol. 344]

OFFERS IN EVIDENCE

The Court having theretofore directed the defendants to produce certain specified minutes and copies of certain specified communications described in paragraphs 1 and 7 of the subpoena duces tecum (Complainants' Exhibit 1), and the defendants having submitted to the complainants copies of the minutes and letters as so directed, counsel for the complainants thereupon offered and read all of the material furnished by the defendants as aforesaid, being as follows:

That part of the minutes of the meeting of June 26, 1933 of the Board of Directors of TVA which relates to the opposition of said Board to the granting of further licenses in the Tennessee River Basin:

"The Board directed counsel to formally request the Federal Power Commission, on behalf of the Corporation, not to grant further licenses in the Tennessee River Basin, and authorized counsel to file appearances and take appropriate action to oppose the granting of such further licenses."

That part of the minutes of the meeting of May 20, 1934 of the Board of Directors of TVA which relates to the granting of further licenses in the Tennessee River Basin:

"Chairman Arthur E. Morgan was authorized to forward to the Federal Power Commission a letter stating reasons why the application of the Southern Industries & Utilities Company for a license to construct a dam on the lower Tennessee River should be rejected. A true copy of the letter, labeled exhibit 5-20-34a, is attached to these minutes and made a part hereof."

A copy of the letter referred to in the foregoing resolution and conceded by counsel for defendants to have been sent to the Federal Power Commission over the signature of Dr. A. E. Morgan as Chairman of the Board:

"Washington, May 21, 1934.

Federal Power Commission, Washington, D. C.

GENTLEMEN:

Our Board has given careful and extended consideration to the Southern Industries & Utilities Company's proposal

for building a dam on the lower Tennessee River. We regret that owing to pressure of official duties we are unable to personally appear before your Commission in this matter.

In support of its former objection to the proposal of the applicant, the Tennessee Valley Authority presents the following reasons why the application of this company for license should be rejected.

When Congress passed the Tennessee Valley Act of 1933, it placed on the Tennessee Valley Authority the responsibility of an orderly and proper development of the Tennessee River for power, flood control and navigation. The Authority is carrying out this development as rapidly as is consistent with the public interest. Toward this end, it has well under way the construction of Norris Dam and Wheeler Dam, at an estimated cost of \$73,000,000, and it has a corps of engineers making surveys and plans for developing additional storage and run of river projects, including that of the Aurora or lower Tennessee. Developments of this site by private enterprise therefore would be contrary to the intention of Congress as expressed in the Tennessee Valley Act, and contrary to the policy and program of the Authority.

The proposal of the applicant that the Federal Government pay the cost of the navigation benefits, estimated to cost \$14,000,000, and that the applicant pay the cost of the power feature, estimated to cost \$10,000,000 by the applicant, does not fairly represent the respective interests of the applicant and the Government in the situation. The amount of firm power available at the Aurora site will depend to a large extent on the regulating effect of Norris and other storage reservoirs, which represent a large investment and which will probably more than double the ultimate value of the power possibilities at Aurora. This investment by the Government in storage reservoirs will set the Government's interest in the Aurora project at much more than 60 per cent—perhaps nearer 80 per cent. Inasmuch as the Government will have this large proportion of the investment, there seems to be no good reason for it to give over the ownership or operation of the power feature to a private agency. In addition to the proposed investment of about \$35,000,000 in the Norris project, the Tennessee Valley Authority is making plans for early construction of two other storage reservoir projects estimated to cost over \$40,000,000,

and has made a request for an appropriation towards this construction. Additional future storage projects are contemplated. All of these storage reservoirs will operate to increase the primary power at the run of river plants, including that to be built at Pickwick Landing, for which the Authority is now making plans. The applicant's proposed dam will decrease the power head at Pickwick Landing by 11 feet from that proposed by the Tennessee Valley Authority, making this amount of head unavailable for the primary power afforded at this point by the storage at Norris and other storage reservoirs.

The applicant bases its plans on the assumption that 60 per cent of the cost of the project will be borne by the [fol. 346] Federal Government. No such appropriation has been made. Since Congress has already appropriated funds to the Tennessee Valley Authority for the unified development of the Tennessee River Basin, it—a typographical error, I think it means 'it' — it becomes questionable whether the applicant can consistently expect an appropriation of Federal funds for the use of a private agency for development of the lower Tennessee.

An essential feature of the program of unified development by the Tennessee Valley Authority is the interconnection of the various power units to permit economical production and operation. Thus at times when most of the power at Aurora is drowned out by high water, this deficiency can be supplied from Wilson and Wheeler Dams, and other dams to be built on the lower Tennessee, where the excess flow at such times would provide an abundance of power. A unified system will best permit such coordinated control and operation. Such coordinated control and operation of the Tennessee River system as a single unit is essential to the most economical production and use of hydro-electric power from the river. The rates at which water will be stored and released in the various reservoirs in the branch streams should be determined by the coordinated needs at the power plants on the main river. If any power plant on the main river is left out of this control, the value of the public investment in the upper storage reservoirs would be reduced, and the cost of power would be correspondingly increased.

The Tennessee Valley Authority now has an organization of experienced engineers and designers actually at work on plans and designs; it has an efficient construction force

actually engaged in dam construction; it has construction plant and equipment especially designed for dam construction; and it is equipped for the expeditions and economical planning and execution of this kind of construction. The applicant is not so equipped. One of the first steps towards building a dam on the lower Tennessee may be the building of a transmission line from Muscle Shoals for a power supply during construction, and for an interconnecting line. This would also supply power for other purposes. An actual power supply in the vicinity of the Aurora site would therefore be achieved more quickly under the general program.

The advantages claimed by the applicant for early construction of a dam on the lower Tennessee will obtain most fully if it is constructed and operated by the Tennessee Valley Authority, and in that case the benefits will be more wide-spread and more complete, and will better serve the public welfare.

For these and other reasons, we request that this application for license be rejected.

Sincerely yours, Tennessee Valley Authority, By
Chairman of the Board."

[fol. 347] A copy of the protest filed by TVA with the Federal Power Commission on or about May 25, 1934, in opposition to Project No. 920 Aurora Dam Site, and which counsel for defendants conceded went out over the signature of Mr. Lilienthal as General Counsel for TVA:

"Protest of the Tennessee Valley Authority.

The Tennessee Valley Authority (created under the terms of the Tennessee Valley Authority Act, approved May 18, 1933, as found in 48 U. S. Statutes at Large, p. 58, Chap. 12-A, Title 16, U.S.C.A.) now appears before the Honorable The Federal Power Commission and protests against the granting of any license to the Southern Industries and Utilities, Inc., and respectfully shows.

(1) The protestant's address is New Sprinkle Building, Knoxville, Tennessee.

(2) Protestant objects to and protests against the granting of any license to the Southern Industries and Utilities for the construction of a power dam or other hydro-electric project called in this record the Aurora Dam,

to be located at or near Shannon Landing, on the Tennessee River in the States of Tennessee and Kentucky.

(3) Protestant is interested in this project because under the terms of the Tennessee Valley Authority Act of 1933 Protestant is charged with the duty of controlling the destructive flood waters of the Tennessee River basin, of improving navigation on the Tennessee River, and of bringing about the maximum generation of electric power consistent with flood control and navigation; because protestant in the course of the performance of these duties has under consideration and is planning to construct dams at various sites on the Tennessee River with the operation and construction of which the proposed dam at Shannon Landing would seriously conflict; and because protestant, pursuant to its statutory and public duty, plans to develop and improve the Tennessee River in its entirety.

(4) Protestant desires to become a party to this proceeding.

(5) The grounds upon which Protestant objects are:

'(a) The applicant, Southern Industries and Utilities, Inc., is without requisite financial responsibility, and if a license were issued to the Southern Industries and Utilities the improvement of the river by the protestant or anyone else would necessarily be delayed thereby.

[fol. 348] (b) The proposed development by the Southern Industries and Utilities, Inc., is not consistent with the most comprehensive scheme of development for the Tennessee River and therefore the scheme should not be adopted by the Commission nor approval of the project be given.'

The proposed development by the Southern Industries and Utilities will drown out eleven feet of the usable head of the high dam which, under the plan of the Army Engineers as shown in House Document 328, is proposed at Pickwick Landing. Protestant plans to construct a dam at the Pickwick Landing site, and the construction by the applicant of the dam at Shannon Landing would therefore directly affect the power development of the protestant.

The location of the applicant's dam at Shannon Landing would necessitate the construction of an additional low navigation dam at Aurora Landing with appurtenant

lockage facilities, which would be an unnecessary inconvenience to navigation.

By the construction of the dam at Shannon Landing instead of Aurora Landing, approximately eight feet of usable head of water will be lost irretrievably because it would not be economically feasible to construct an additional power dam below the Shannon Landing site to take advantage of this eight feet of head.

Inasmuch as the Federal Government through protestant already has under construction a power dam at Norris and the Wheeler Dam just above Muscle Shoals, and inasmuch as the United States through protestant owns and operates the Wilson Dam and proposes to construct and operate a dam at Pickwick Landing, and proposes to construct other storage dams on the headwaters of the Tennessee River, no scheme is comprehensive which would give an independent ownership to the dam at Shannon proposed to be built by the applicant. The dam at Shannon will produce very little power, on account of reduction of head, during high water periods, and at the same time the protestant's Norris, Wheeler and Wilson Dams would be producing at their maximum rates and would be able, through interchange of power to make up for the deficiency caused by the drowning out of the dam on the lower Tennessee. A unified ownership and operation with Norris, Wilson and Wheeler Dams, of any dam to be constructed at or near Aurora Landing is therefore essential to a comprehensive scheme of development and necessary to eliminate the construction of a costly steam plant which would otherwise be required to develop any substantial amount of prime power.

(c) The United States Government itself should develop the project, and this Commission should decline to grant a license to the Southern Industries and Utilities or to any other private corporation.

[fol. 349] The United States Government has as above recited already under construction a storage dam at Norris, a run-of-the-river dam at Wheeler, and has already built and is now operating the Wilson dam. The United States, through protestant is planning the construction and operation of additional storage and run-of-the-river dams, and further private ownership and operation of dams on the Tennessee is inconsistent with the evident intention of the

Federal Government to undertake itself the development of the Tennessee River.

The Tennessee Valley Authority is developing a large amount of storage at Norris and will, in the future will develop other storage dams. This storage will be released in such manner that the generating plants at these dams and at the interconnected run-of-the-river plants will develop constant power. The plant proposed by the applicant would receive variable flow during the low water season and being isolated from the system would not receive support from the other generating plants.

The Federal Government's present large investment, running into many millions of dollars, in the Norris storage reservoir dam and the proposed additional storage reservoir dams to be built, is economically justified on the basis that the United States will own and operate as many run-of-the-river plants below the storage dams as may be built on the river, in order to reap the maximum advantage of the storage dam investment.

Independent ownership of the Shannon Landing dam will lead to complicated questions of headwater benefits claims of the United States against the applicant, and may lead to claims for damages by the applicant against the United States by reason of the effect upon applicant of variations in stream flow caused by the policy of the United States to produce a uniform output of power rather than a uniform stream flow.

(6) This protest will be supported by evidence, both oral and documentary and in behalf of the protest the following witnesses will appear to testify:

Carl A. Bock, James S. Bowman.

(7) A copy of this protest has been served upon the applicant the Southern Industries and Utilities, Inc.

Wherefore, protestant prays that it be made a party to this proceeding and that no license be issued to Southern Industries and Utilities, Inc.

Tennessee Valley Authority, By — —."

[fol. 350] That part of the minutes of the December 14, 1937 meeting of the Board of Directors of TVA which relates to the assignment to the City of Knoxville of TVA's contract with the Volunteer Portland Cement Company:

"Resolved, that the Board of Directors hereby approves the assignment (Exhibit 9-14-37h) to the City of Knoxville, Tennessee, of all the Authority's rights, title and interest in and to the power contract with the Volunteer Portland Cement Company dated August 14, 1936.

Further Resolved, that Arthur E. Morgan is hereby authorized and directed to sign the instrument for and on behalf of the Authority."

Counsel for defendants then requested that certain excerpts from Complainants' Exhibits 114, 115 and 116 be transcribed in the record.

"Judge Allen: The Court will not receive in evidence isolated and garbled portions of a document. The Court has received the entire statements and reports in question, and the Court will permit counsel for the Authority to call the Court's attention to whatever they wish in those statements and reports. The Court feels that it could if it cared to, read the entire statement in the report.

Mr. S. D. L. Jackson: May we have our exception, and also, if your Honor please we do not think the excerpts that we offered were garbled. We think they were accurate. I mean truly reflective of what the witness said, in those hearings.

Judge Allen: They were only parts.

Mr. S. D. L. Jackson: We did not distort the meaning of his answer.

Judge Allen: They were only part of the statement of a report.

Mr. S. D. L. Jackson: That is true, they don't purport to be his entire testimony.

Judge Allen: You may have your exception.

Mr. S. D. L. Jackson: Thank you.

Judge Allen: And the Court adheres to its ruling.

Mr. S. D. L. Jackson: Very well, then, if we may state our objections, if we may state the grounds of them to the reporter, so that they may be transcribed into the record, then we won't take any of the time of the Court in doing it. [fol. 351] Judge Martin: Haven't you stated those grounds, yesterday? Are there any new grounds that have not been stated?

Mr. S. D. L. Jackson: Yes, I think there is one new ground that has not been stated; that certain of these ex-

tracts that our friends now want to call the Court's attention to in those books are merely self-serving declarations.

Judge Martin: That was stated.

Mr. S. D. L. Jackson: And for the further reason that they go beyond any explanation or clarification of any extract that we called the Court's attention to, but they are something entirely independent, evidentiary matters, going to matters, going to matters of defense as I see it.

Judge Allen: Your statement now goes into the record, your further objection?

Mr. S. D. L. Jackson: Very well. That would be the substance of it, and I would like the record to show that we make those objections to each extract separately."

Thereupon at the request of counsel for the defendants the following excerpts from Complainants' Exhibit 114 (which excerpts are set forth in Appendix F following Defendants' Exhibits), from Complainants' Exhibit 115 (which excerpts are set forth in Appendix G following Defendants' Exhibits), and from Complainants' Exhibit 116 (which excerpts are set forth in Appendix H following Defendants' Exhibits) were copied into the record for the attention of the Court:

From Complainants' Exhibit 114: beginning with the last statement of Dr. Arthur E. Morgan on page 468 and extending to the bottom of page 469; the table on page 474; the table on page 475; the chart on page 477; beginning on page 480 immediately under the heading "General Investigations of Water Resources" and ending with the statement of Dr. Morgan on page 481 "We are working in very close cooperation with them"; beginning on page 482 with the statement of the Chairman "This is what is in my mind" and extending through the statement of Dr. Morgan on the top of page 483; on page 485 the first eight lines under the heading "Additional Dams Necessary for 9-foot Channel and for Flood Control"; on page 495 beginning with the statement of Dr. Morgan "Yes, it is this" and extending to the bottom of the page; beginning on page 518 immediately under the heading "Transportation Investigations" and extending through the statement of Dr. Morgan on page 519 ending "That is all we are trying to do"; beginning on page 523 with the question of the Chairman "You refer to four dams" and extending to the head-

ing on page 524 "Main River Dam Projects"; on page 535 beginning with the statement of Mr. Lilienthal "About 98 per cent" and extending to the bottom of the page; on page 538 the five lines beginning with the statement of Mr. Lilienthal "This is new construction"; on page 540 beginning with Mr. Thurston's question "Section 23 (3)" and ending with the statement of Dr. Morgan "or are we going to use it?"; on page 616 the last statement of Dr. Morgan under the heading "Power Development, Wilson Dam" and on pages 616 and 617 the entire section under the heading "Navigation"; on page 626 beginning immediately under the heading "Flood Damages in the Tennessee River Basin" and extending through the statement of Dr. Morgan on page 627 ending "to add to its flood storage"; on page 631 the section under the heading "Total Reservoir Storage Of Water at Four Dams" and the first seventeen lines under the heading "Navigation to Knoxville, Tenn."; beginning with the last two sentences on page 635 and extending to the heading on page 636 "Cash Disbursements".

From Complainants' Exhibit 115: on page 115 beginning immediately under the heading "Exploring Work for Gilbertsville Dam" and extending to the end of the page; on page 124 the first question and answer at the top of the page; on page 125 beginning with Dr. Morgan's statement "Yes, sir; the output" and extending through the following two questions and answers; beginning on page 126 with the statement of Dr. Morgan "The only way to get at that" and extending through the first thirteen lines on page 127; beginning on page 127 with the question of Mr. Bacon "You say that half" and extending through the sentence of Dr. Morgan on page 129 ending "what expenditure would be justified by flood control and by navigation"; beginning on page 129 immediately under the heading "Ohio River Largest Contributor to Flood Waters of Mississippi" and ending with the sentence of Dr. Morgan on page 131 ending "a flood came along that tore the levees to pieces"; the entire section under the heading "Value of Dams In Reducing Flood Hazard" beginning on page 131 and ending on page 133; on page 133 the question of Mr. Cannon beginning "You speak of a storage dam" and Dr. Morgan's answer thereto; on page 135 the entire page; on page 136 beginning immediately under the heading "Gil-

bertsville Dam" and ending with Dr. Morgan's sentence "You would not be saving that for power"; the entire section under the heading "Present and Prospective Improvements in Navigation" beginning on page 138 and ending on page 140; on page 195 the answer of Dr. Morgan beginning "There is a silting problem there"; the first ten lines of page 196; on page 205 the question of Mr. Taber beginning "It is a question of adding" and Dr. Morgan's reply thereto; the entire section under the heading "Purpose of Guntersville Dam" beginning on page 211 and ending on page 212; on page 226 beginning with the question of the Chairman "Is it for navigation alone" and extending to the end of the page; on page 235 the entire page.

From Complainants' Exhibit 116: on page 341, lines [fol. 353] 7 to 18 inclusive; beginning immediately under the heading on page 341 "General Planning of Tennessee Valley Authority System" and extending to the end of the first paragraph on page 342; on page 360 the question and answer under the heading "Projects Primarily for Flood Control"; beginning on page 367 under the heading "Navigation on Tennessee River" and extending to the last sentence on page 369; on page 374 the statement of Dr. Morgan beginning "The operation of Norris Dam" and ending "no excessive floods later than that"; on page 375 beginning with the statement of Dr. Morgan "Yes. I am speaking in general terms." and the two succeeding questions and answers; beginning on page 376 with the statement of Dr. Morgan "We have made a report" and extending to the end of the fine print on page 378; the tables and the explanation thereof on pages 399, 400, 401 and the first two lines on page 402; beginning on page 411 under the heading "Justification of Estimates" and extending to the end of the first paragraph on page 414; on page 416 beginning immediately under the heading "Investigations, Gilbertsville Dam" and extending to the end of the page; on page 419 beginning with the paragraph starting "Take flood control" and ending with the statement of Dr. Morgan "is admitted today as necessary"; on page 425 the first two questions and answers under the heading "Ultimate Limit of Program"; beginning on page 451 with the paragraph "I would like to refresh" and extending through the paragraph on page 452 ending "subsidiary purpose in tying of the dams together"; beginning on page 498 with the paragraph "The need for power"

and extending through the first two lines at the top of page 499; beginning on page 529 under the heading "Efforts of Cities and Tennessee Valley Authority to Purchase Distribution Systems" and extending through the first eleven lines on page 530; the table on pages 537-8.

At this point counsel for complainants offered in evidence and the Court received as Complainants' Exhibit 328 a copy of the report made by the TVA to Congress, entitled "The Unified Development of the Tennessee River System, Tennessee Valley Authority, March 1936", which was attached as Exhibit A to the answer of the defendants in this case.

"Mr. R. T. Jackson: There has already been offered in evidence as complainants' exhibit 105, House document 328, 71st Congress, Second Session, which the Court will recall has the report upon the Tennessee River and its tributaries. The Court will also recall there is what is known as volume 2 of that report, which consists only of maps, a part of which were published, and of course, all of which were in the published volume, a part of which were not published as disclosed in the volume of the report. At [fol. 354] this time I would like to offer in evidence as exhibit 105-C, plate 7, and exhibit 105-D, plate 8, from the maps that are in volume 2. I will say that the purpose, largely, in offering them is for the information of the Court, and that I think that they clarify the situation,

Judge Allen: The Court considers that this entire volume 2 is in evidence, just as volume 1 is.

In other words, the Court will consider anything in this volume which pertains to these contracts as a part of the report.

Mr. R. T. Jackson: May I make this statement? We have no objection about that. The only thing that occurs to us is that there are 600 maps. We only see two that are material, and if the other side sees any more that are material, we would think they might offer them, and we would not have to print 598 more.

Judge Allen: We expect the aid of counsel on each side in picking out the maps, but the Court receives in evidence the entire report.

Mr. R. T. Jackson: I will ask to have these marked here, and I will offer exhibits 105-C and 105-D, plates 7 and 8.

Judge Allen: They are rejected when considered as excerpts only. The entire report is received in evidence. You may have your exception.

Mr. R. T. Jackson: We will note our exception on the ground that the only report, in our view, that is material,—that is, the only maps that are material are those offered.

Judge Allen: Let the record show that the entire volume 2 entitled, "Tennessee River and Tributaries, North Carolina, Tennessee, Alabama and Kentucky" printed by the United States Government printing office in 1930, embodying a letter from the Secretary of War transmitting a report from the Chief of Engineer on the Tennessee River and tributaries, North Carolina, Tennessee, Alabama and Kentucky, covering navigation, flood control, power development and irrigation is received in evidence, and that this volume 2 includes plates 7 and 8, heretofore offered in evidence and rejected upon the ground that they are excerpts only.

Mr. Seymour: Note an exception."

[fol. 355] JOE W. ANDERSON was called as a witness on behalf of the complainants and, having been first duly sworn, was examined and testified as follows:

Direct examination:

I am 48 years old and reside in Chattanooga, Tennessee. I have been City Attorney of Chattanooga since April 1931, and am still City Attorney. I remember the occasion when the City Commission of Chattanooga, together with myself, went to Knoxville to have a conversation with the TVA about the feasibility of having electric power in Chattanooga.

I cannot recall all of the questions that we had under consideration. I remember one of the questions discussed was the feasibility of having the survey made by engineers. That was discussed I believe first. Then another question was the acquiring of the existing distribution system in Chattanooga. Some members of the Board suggested that we might, if we could not purchase it, acquire it by condemnation. I had advised against that, and stated we would have to have special legislative authority to do that,

and also that it would take two or three years. Mr. Lilienthal agreed with me on that. He said it would take nearer ten years than three years. Then the question came up about operating a competitive system, and I don't remember what led up to it. Then the question came up about the City's right to tax a private utility in the event they did have a competitive system. Just what was said prior to the time that came up I don't recall, but Mr. Lilienthal and I discussed the Washington case that had been decided a short time before that. I had read, I think, some two or [fol. 356] three weeks probably before that, either an advance sheet or a daily abstract, where the Supreme Court upheld the right of Seattle, Washington, to tax a private utility which was in competition with it. Just what was said prior to the time that discussion came up I don't remember. Mr. Lilienthal brought up the Puget Sound case as authority for the proposal that the City had the right to tax a private utility and at the same time operate a utility business of its own in competition.

It was discussed as I stated a while ago. I believe Mayor Bass and Commissioner Wilkerson were discussing that question and they called me in and asked me if I was familiar with that case. I don't remember the name of the complainant. It was the Seattle, Washington, case, though, that had been decided by the Supreme Court of the United States a short time before that. Mr. Lilienthal and Mr. V. D. L. Robinson were the only two representatives of the TVA that we talked to about this question.

Cross-examination:

At that time we didn't have the right to own and operate a distribution system. We had filed an application for a contract conditioned on our getting authority and having an investigation made. We did not have authority at that time to issue the necessary bonds. The 1931 Legislature has placed a limitation of 11% on the total assessed value with reference to the issuance of bonds. The Railroad and Public Utilities Commission assessed the property for The Tennessee Electric Power Company properties, but what I have reference to was the 11% of the assessed value [fol. 357] of all property of the City when it comes to issuing bonds. The act I referred to though was the one that limited the City in the issuance of bonds to 11% of the

assessed value of all real estate in the City. That was the 1931 amendment to the Charter that was repealed in 1935. The Railroad and Public Utilities Commission fixes the valuation of all utility property. The tax rate is fixed by the City and is uniform as to all property in the City.

Redirect examination:

The Tennessee Legislature at the last session passed a tax that applied to utilities of 3% of the gross revenue for the state purposes only. The City gets no part of that.

(The witness was excused.)

E. D. BASS was called as a witness on behalf of the complainants and, having been first duly sworn, was examined and testified as follows:

Direct examination:

I am 64 years old and reside at the Patten Hotel in Chattanooga, Tennessee. I am Mayor of Chattanooga and have been for ten and one-half years and am still Mayor.

I remember the occasion when I, together with the other Commissioners, went to Knoxville to have a conference with Mr. Lilienthal as representing the TVA about the feasibility of Chattanooga getting into the power business. Prior to 1935, responsibility for public power in Chattanooga was with the City Commission and the Mayor. In [fol. 358] 1935, the Legislature created a Public Power Board, and since that time we have had no direct responsibility on that question. Therefore, there may be some details in the way of dates and other things that I am not able to recall prior to that time. I have not had any reason to burden my memory with those things since.

I was present at the conference with Mr. Lilienthal in April 1934. I had made an engagement with Mr. Lilienthal to bring the City Commission up and discuss the feasibility and probability of TVA power for Chattanooga. In other words, the purpose of the visit was to secure information for us, as much as possible, as much as anything else. In the course of the conversation, many points were raised. Among them I remember one statement that Mr. Lilienthal made that competing systems were undesirable and indi-

cated that it would be better if we could acquire the local distribution system. In connection with that question, or that statement, some member of the party raised the question that perhaps the local company would not sell to us. Then he called our attention to the Seattle case, a recent decision of the Supreme Court which, as I remember, he said authorized us to levy a tax on private utilities. I think I had some conversation with Mr. Lilienthal prior to that time about Chattanooga getting TVA power, when he came to Chattanooga and made a speech before the Rotary Club. The date of that speech was probably Sept. 29, 1933. I couldn't tell you who was present on that occasion. As I remember it, I met Mr. Lilienthal in his room at the Patten Hotel. We had some discussion as to when power would be available and he did tell me, as I remember now, it would be available in eight or ten months, or something like that, I don't know.

[fol. 359] I have met Mr. Llewellyn Evans, who is an engineer representing TVA. He represented TVA at a conference of the City Commission of Chattanooga with regard to a power study.

Examination by the Court:

Mr. Evans is Chief Electrical Engineer of TVA.

"Judge Allen: Is that conceded?

Mr. Fly: We concede his position, but not the relevancy of his statements to these gentlemen. I don't see how that would bind the Board."

Direct examination continued:

Mr. Evans appeared before the Commission with regard to the power study on December 5, 1933, and in the course of that conversation I said to him, "We have no charter authority to go into the power business."

"Q. And he replied, 'Your charter is deficient in that respect. Well, what you need is a good lawyer?'

Judge Allen: Objection sustained.

Mr. Fly: Oh, I object to that.

Judge Allen (continuing): To that question; both to the form of it, and the Court adheres to the position which it has heretofore taken, that conversations and statements by

employees of the Authority are not relevant and material. The Court has permitted testimony with reference to statements by Mr. Lilienthal because of his position in the Authority; it has allowed evidence of statements of Dr. Morgan. The Court does not intend to extend that to its employees.

Mr. Spears: If your Honor please, I want to state the purpose of this and note our objection. Our purpose of proving this is to show that in the course of their business of disposing of their power these men were sent here as their representatives, and they are bound by any statements they make in the course of that business.

[fol. 360] Judge Allen: The objection is sustained upon the ground that the evidence sought to be adduced is immaterial and irrelevant. The Court will state to counsel for the complainants that they must bear the burdens of their situation in this case as all parties who seek benefits must bear corresponding burdens. The complainants have linked themselves together in large numbers to try a case based upon the existence of a common legal right. If we pursue the possible ramifications into the detail of evidence which could be offered here, this case will run into an undescribed amount of time. The Supreme Court of the United States would rightly criticize both counsel and the Court for permitting such a mass of irrelevant and incompetent testimony to be introduced. The Court has heretofore held that some of the evidence sought to be produced in this case is immaterial and irrelevant because of the fact that you are seeking relief here based upon your common legal right. Now, the details we consider lead us into multifariousness. The Court adheres to its ruling.

Mr. Spears: Note an exception please. I would like for the record to show that the witness, if permitted to testify, would state that on that occasion Mr. Llewellyn Evans, Chief Engineer of The Tennessee Valley Authority, in response to a question from the witness, stated,—to a statement by the witness that: 'We have no charter authority to go into the power business,' said 'Your charter is deficient in that respect. Well, what you need is a good lawyer,' and we note an exception."

Cross-examination:

The documents (offered and received in evidence as Defendants' Exhibits 7, 8 and 9) are respectively a letter

dated Oct. 24, 1933 to TVA, attention Mr. Lilienthal, a letter dated March 19, 1934, to TVA, attention Mr. Lilienthal, and a letter dated March 26, 1934, to Mr. Robinson, Administrative Assistant to Mr. Lilienthal, all of which were written and sent by me as indicated.

(The witness was excused.)

[fol. 361] Counsel for defendants then requested that the following excerpt from Complainants' Exhibit 112 (which excerpt is set forth in Appendix E following Defendants' Exhibits) be copied in the record for the attention of the Court:

On p. 272 the statement of Dr. Morgan beginning "The people of the community."

"Mr. S. D. L. Jackson: Complainants object on the grounds previously stated to the introduction of excerpts by the defendants at this time, but make no objection to the fact that the excerpt was not called to the Court's attention when the other excerpts from similar exhibits were copied into the record previously."

The excerpt referred to was thereupon copied in the record.

[fol. 362] GEORGE R. PARKER was called as a witness on behalf of the complainants and, having been first duly sworn, was examined and testified as follows:

Direct examination:

I am 38 years old, reside in Chattanooga and am employed by The Tennessee Electric Power Company in the engineering department. Among my duties I have general charge and supervision of the map-making department of The Tennessee Electric Power Company.

The map (offered in evidence as Complainants' Exhibit No. 332) shows the transmission and rural distribution lines in the area penetrated by TVA as of November 1, 1937. It shows the lines of the TVA, the lines of cooperatives and municipalities that are distributing TVA power, the lines of complainant companies, and other lines in the area covered by the map. This map, with a few exceptions, was

prepared from Complainants' Exhibits numbered 7, 27, 37, 101, 199, 205, 206, 207, 208, 209, 210 and 326. There are certain lines shown on this map as proposed lines, which do not appear on those particular exhibits. I was not referring to those broken red lines in Cherokee County, Alabama but rather to the purple transmission lines, for instance, the line around Memphis and other places. Neither do those particular broken red lines appear on any of the exhibits that I have mentioned.

The broken purple lines represent, as shown by the legend, lines "Under construction or proposed". To the extent that they have been staked out, it is my information that the line from Pulaski to Fayetteville, the one from Columbia, Tennessee, going southwest to Mount Pleasant, the line from Columbia, Tennessee, to Murfreesboro and the line from Norris Dam to Knoxville are under construction. As to every one of the broken lines, except for those that are [fol. 363] shown on the exhibits I referred to, I have taken the information from Mr. Lilienthal's testimony in the hearings before the sub-committee of the House of Representatives on the Second Deficiency Appropriation Bill for 1937. (Complainants' Exhibit 116.)

(Counsel for complainants stated that they expected to show by another witness the correctness of the lines shown on Exhibit 332 in Cherokee County, Alabama, and subject to such further proof offered the map in evidence.)

"Judge Allen: The Court will rule upon the admissibility of the map when the proof is made concerning it."

Cross-examination:

The source of my testimony regarding the lines from Memphis to Covington, Tennessee and to Jackson, Tennessee was Mr. Lilienthal's testimony in the Hearing before the Sub-Committee of the Committee on Appropriations (Complainants' Exhibit 116). It was listed in a table that was a part of his testimony. I don't know whether that line has been authorized for construction. All the information I have is that it was listed in a table submitted by Mr. Lilienthal and funds for its construction were requested. I don't know whether the line was authorized by the Board of Directors of the TVA. The line from Nashville to Columbia is in the same category as the other.

Examination by the Court:

I mean by "in the same category" that funds for its construction were requested in the hearings by Mr. Lilienthal.

Cross-examination continued:

I knew that the Appropriations Committee cut down on the funds that were allowed and did not allow all of the funds that were requested.

[fol. 364] The dotted purple line running from Columbia down to Wilson Dam is in the same category as the line from Nashville to Columbia. I do not know it to be a fact that the TVA has actually abandoned any prospect of that line.

I know the status of the line running from Wilson Dam in Alabama to Tupelo in Mississippi. In these same hearings in a table on page 457, I believe it is, it was shown that \$48,000 had been spent for surveys and right-of-ways for that line. It was not mentioned in that table that that line had been long since definitely abandoned, whereas certain other lines which had been abandoned were mentioned. I do not know whether that line from Wilson Dam to Tupelo has been abandoned, nor do I know whether any construction has been done on it. I think that it is not actually under construction.

In answer to the question where I got the word "penetrated" in the legend, that title is the same title used on a map that was used in a hearing for preliminary injunction. I do not know that that was suggested other than from the map. It was taken from the map. I did not talk to anyone about that wording. I did not select that wording myself. I took it from that map.

"Mr. Fly: Your Honor, I do not know how many other inaccuracies and misleading representations are on the map. It would be impossible for us to know in a few minutes notice, but I think there is certainly ample demonstration of the gross inaccuracy of it, and we therefore object to it, and of course, when a more accurate map is presented we would like to have a few minutes to look it over and examine the more accurate map at the time it is submitted.

Mr. R. T. Jackson: I object to counsel's statement as to misleading statements, a statement of which he is very fond, but one with which I am not accustomed in the trial of cases.

May I move to strike it out, and to state this. On this map we have shown the latest public information or official information [fol. 365] with reference to the proposed lines we could get, statements before the Committee by the directors. If there has been any change subsequent to that time, the defendants when they come to offer their proof can prove it. But it has no bearing upon our right to show that.

Judge Allen: With reference to the testimony, with reference to this map, complainants' exhibit 332, what is the distance between Nashville and Columbia on this line that you testified has been proposed to be built by Mr. Lilienthal, what is the mileage?

The Witness: What is the mileage? That is approximately 40 miles.

Judge Allen: And you gave the same testimony with reference to the line from Columbia, Tennessee, to Wilson Dam in Alabama, didn't you?

The Witness: Yes.

Judge Allen: What is that mileage?

The Witness: I would say around 60 miles.

Judge Allen: And the same testimony with reference to the line from Wilson Dam to Tupelo, Mississippi, is that right?

The Witness: Yes.

Q. What is that mileage?

A. That appears to be 50 or 60 miles.

Mr. Fly: And the line near Memphis, your Honor, Memphis, Covington, Jackson.

Judge Allen: What is the mileage of that line, Memphis, Covington, Jackson?

The Witness: That appears to be about 70 or 80 miles.

By Mr. Fly:

Q. Those are all heavy lines, are they not?

A. Yes, that is shown in the high voltage classification.

Judge Allen: The Court will rule upon the admissibility of this exhibit when all of the testimony has been properly presented."

(The witness was excused.)

[fol. 366] M. B. PENN was called as a witness on behalf of the complainants, and having been first duly sworn was examined and testified as follows:

Direct examination:

I am 35 years old, reside in Birmingham, Alabama, and work for the Alabama Power Company. I am familiar with the electric transmission and distribution facilities in the area of the location of the broken red lines in Cherokee County, Alabama, shown on Complainants' Exhibit 332 for identification. There is a rural cooperative association known as the Cherokee County Electric Membership Corporation in existence and they are now constructing lines in Cherokee County. The lines in the northern part of the county are constructed and those in the southern part are now under construction. The lines shown in Cherokee County by broken red lines have been surveyed and staked out and I have seen the stakes. This map correctly shows the location of those various lines to which I have referred.

Cross-examination:

A private contractor is building those lines in Cherokee County.

(The witness was excused.)

"Mr. Fly: I, of course, object to the map (Complainants' Exhibit 332), your Honor, on the ground previously stated. I think the map, our friends have all of the lines that have been definitely planned, all of the contracts and the Board resolutions, definitely authorizing the lines, and the witness has testified he has known some of those lines have been abandoned. There are numerous mileages of important lines which are clearly misleading, and with all deference to my friend, there is not a bit of proof that those lines are proceeding. In fact, there is proof to show that other alternative, other than those lines, and on the whole we consider that map based upon that sort of hearsay testimony [fol. 366a] mony, and having established on the face of it that many inaccuracies right off hand, gravely prejudicial. We will be glad to cooperate with counsel and give them the precise records on these things, which will show exactly where the lines are, show not only where they are constructed, but where they are authorized. In the meanwhile we object to this exhibit.

Mr. Bemis: If the Court please, we do not understand the facts stated by Mr. Fly in the way he states them. For one thing, this map does bring together in one exhibit all data which has been offered by numerous smaller maps, so that the Court can conveniently see what all those various other maps show. The only additional data which appears on the map are the lines which the witness testified he took from reports which have been made to Congress.

Judge Allen: How much mileage do you estimate that to be?

Mr. Bemis: If the Court please, there is a scale of the mileage shown.

Judge Allen: I am asking for information, whether it covers all of these broken purple lines or only those testified to, what is your understanding?

Mr. Bemis: My understanding is that the broken purple lines are lines which the Tennessee Valley Authority asked for appropriation to construct in the last appropriation hearing.

Judge Allen: And that that applies to all of the broken purple lines shown on the exhibit?

The Witness: Some of those lines I testified to have been actually staked out, and some under construction.

Mr. Fly: I do not think there is any question about that particular line being under construction.

Mr. Bemis: Is not it true, Mr. Fly, that all of the purple lines are lines which are shown in the 1937 appropriation hearing, as lines for which the Tennessee Valley Authority requested funds to build?

Mr. Fly: It is my understanding at that time Mr. Lilienthal testified, and presented these lines as probable lines that would be built. It is my further understanding the records of the Committee show that the Appropriations Committee did not recommend, and the Congress did not appropriate money for those lines. And it is my understanding further, and it is the witness' understanding, a [fol. 366b] number of lines have been definitely abandoned.

It is also my understanding that counsel have a complete record of all Board resolutions authorizing lines. They have a complete map and they do not challenge the accuracy of it, showing every line constructed, every mile of line under construction, and every mile of line authorized. And this witness does not come in here and state he has been

over these lines, and knows this is accurate. This witness does not come in and state these lines are authorized for construction, either by the Congress or by the Board. He merely says I read Mr. Lilienthal's testimony and these are the lines that at that time he might have recommended building. I see no reason why we should clutter up the record with lines of that character. The true record, which is in the possession of the gentleman now, showing that those lines won't be built, at least showing the lines have not been authorized by any authoritative source.

Mr. Seymour: May it please the Court, with reference to the statement of defendants' counsel that we have the map. As the court knows, I have been undertaking to work with the other side, and we have received the maps. But the maps have been in controversy, we have pointed out to the gentlemen errors on the maps. They have taken them back on three occasions to make corrections and I think they returned them to us and we are checking. While I personally do not know there are any errors made on the map, we are checking for the purpose of determining. We do not want the record to show we have a map we are not recognizing. We are going to accept it as quickly as the map makers say it is correct.

Mr. Fly: I am happy to accept that.

Mr. R. T. Jackson: May I say something about the preparation of the map and the appropriations. I think their map as I understand, is of a definite date, showing actual construction.

Mr. Fly: No.

Mr. R. T. Jackson: Lines authorized for construction on that date by a proper resolution, of specific lines. We are dealing not merely with what is accomplished, but what is expected. The facts are in the 1937 hearing Mr. Lilienthal stated to the Committee, as the basis of informing them what appropriations might be made, that first about \$8,000,000 of transmission lines were proposed. Proposed for the coming year. Then they refused, and reduced that to about \$5,000,000. They asked the right to use that to build any lines they saw fit, or acquire them. Of course, they had the earnings to do it with. And when it came to the appropriation act, the appropriation act says, 'For the purpose of carrying out the provisions of this act', and so forth. Then: 'For the purpose of construction or purchase of transmission lines and other facilities'. There was, of

course, no restriction by congress as to the transmission lines. It is a blanket appropriation. They are entitled to use for the construction or purchase of transmission lines. Certainly the best evidence we can bring before the Court is the last official statement of a managing official before the Congress. If they have changed their plans, they could easily prove that and put in their evidence.

Mr. Fly: Yes, but in the meanwhile, knowing quite well that map is inaccurate, as the witnesses have testified, they want to create a false record in filing the map, knowing full well the Court would not include this Georgia part of the map. That is the question presented in this Court.

Mr. Fly: Now certainly when an individual director goes before the Appropriations Committee he is going to ask for plenty of money. I hope he does; otherwise he is going to come out of there disappointed.

Mr. R. T. Jackson: Let's have no misunderstanding—

Mr. Fly (continuing): But the mere fact that at one time Mr. Lilienthal suggested the possibility or the propriety of these lines does not now give us any authoritative substitute for concrete plans.

Now, the Committee has cut down the appropriations, now the Authority has proceeded for months since that time, for a number of months, certain of the lines have been abandoned, and every line where there is any authorization, where there is any concrete plan to go ahead, every one of those lines is set forth in the information given to these gentlemen.

Judge Allen: Mr. Jackson, If I said to you, 'I hand you a map,' and I say 'This is a map of the transmission and rural distribution lines in this territory,' what would that mean?

Mr. R. T. Jackson: It would mean to me what was constructed, but that is not what we did here, and not what the witness said.

Judge Allen: Isn't that what you did here, assuming or bearing in mind the small words of the writing? But the print, the large print says, the thing that hits the eye says, 'Transmission and Rural Distribution lines,' and that [fol. 366d] means to one who has to read as he runs, as some will have to do when they go through this case, that means those lines consisting of transmission and rural distribution lines, just as you now said.

Mr. R. T. Jackson: It doesn't seem so to me, when they are put in broken lines, and the legend explains what the broken lines are.

Judge Allen: The legend is small, and the broken lines do not differentiate, as they say, 'under construction or proposed.' There is no differentiation between those under construction and those proposed.

Mr. R. T. Jackson: So far as that is concerned, we are perfectly glad to do that. The difficulty in a cumulative case is the carrying forward of every item of evidence that has come out.

Judge Allen: Now the Court does not mean with reference to a map that is wilfully misleading, but we all do know that the large letters meet our eye first, and make the impression. That is why I asked you what I would mean if I hand you a map and said, 'This is transmission and rural distribution lines.' You said it would mean existing lines.

Mr. R. T. Jackson: Maybe if that is all you said, and that is all that is said on that map, I might think the same thing, but that is not the same situation.

Mr. Fly: You can fish out the other from the fine print.

Mr. R. T. Jackson: Here are these lines right on this list here. If we cannot rely on the statement of the director of the Tennessee Valley Authority solemnly made to the Congress of the United States in the discharge of his duty, as to what they proposed to do, I don't know what we can rely on. And I think that we are entitled to show in an injunction suit not merely what has already been done, but what is proposed to be done. And that is much more definite and concrete evidence of what is proposed to be done than is usually available in an injunction suit. Now, if there is any correction to be made these gentlemen can make it, but they cannot object to our testimony by counsel coming in and testifying before the Court he is going to prove something else.

[fol. 366e] Mr. Fly: All that is proved here is that Mr. Lilienthal recommended that appropriations at that particular time, that appropriations might be made for these lines. I have not checked that, but for the purpose of this argument I assume that the witness is correct in making that assertion.

There is no effort here, and complainants have wilfully avoided the effort to get the actual lines, and get those that

were actually under construction or actually authorized. I don't think that under the pretense of following something that an individual director recommended at one time, under that pretense they should get in a map here which purports on its face to be the authorized concrete plan of the Tennessee Valley Authority.

Mr. R. T. Jackson: I want to invite the attention of the Court to the fact that on page 469 of these hearings which are in evidence there is a table, and it shows at the bottom of the page, second column, estimated cost fiscal year 1938, it is headed 'present and proposed transmission system investment and revenues, summary,' and it shows an item of \$8,507,400.00.

Now then there is less adjustments and transfers to future years' program, and there is an item of \$3,800,000 under that.

That left four million seven, which was the amount appropriated with the right to use other funds.

And those proposed lines are the identical proposed lines as I understand it, that are included in this item of eight million dollars, and which are listed as incidentals, total either for 1938 construction or future years, and that is to some extent explained later by Mr. Lilienthal, where he says they ought to have some leeway as to which lines they build first, because they might be held up here or there.

And then the appropriation, as I read to your honors, is simply a blanket appropriation, and so far as transmission lines is concerned, says 'For the Construction or Purchase of Transmission Lines and other Facilities.'

Judge Allen: What was the name of the witness who testified with reference to these lines, proposed lines?

Mr. Bemis: Mr. Parker is the witness who produced the map as having been made under his direction.

Judge Allen: The map, exhibit No. 332, is rejected because the Court considers it inaccurate and misleading. As indicated the Court will reject all evidence with respect to the [fol. 366f] operations in Georgia. This map, of course, is subject to that criticism, but that ruling has been very recently made, so we understand, of course that this map was made before that ruling.

Discussing the map otherwise than with reference to the operation in Georgia, this map purports to present transmission and rural distribution lines in the areas penetrated

by the TVA as of November 1, 1937, this legend being carried in large capitals.

Actually it is a map of existing and proposed transmission and rural distribution lines in this territory. The legend in small letters shows that some of the lines are only proposed, but there is no differentiation of color between the lines under construction and those only proposed. Both are represented by broken lines, and both are imperfect. The inaccuracy, on a preliminary examination of the witness George Parker, is shown to cover over 200 miles of proposed line.

Mr. Bemis: Now, if the Court please, we would like to have the record show, if we may, that this map is first offered just as it stands, with the lines in the State of Georgia shown, and we understand, consistently with the Court's previous ruling, that the map as so offered, the objection is sustained, on the ground that the lines in Georgia are irrelevant and immaterial to the issues in this case.

And we reserve our exception to the Court's rejection of the map on that ground.

Mr. Fly: The map has not been cut to pieces yet, and I don't think that counsel can make a synthetic offer of it in pieces.

Mr. Bemis: May I make my statement?

Mr. Fly: I object to that manner of offer.

Judge Allen: You may have your exception to the Court's ruling with reference to the map showing the operations in the State of Georgia of the Tennessee Valley Authority.

Mr. Bemis: As I understand it, the Court's ruling respecting the showing of lines in Georgia is that the lines in Georgia in that territory, are not material to any of the issues in this lawsuit.

Now, we would like to have the record show that the map is also offered as it stands, but with it understood that the map is not offered for the purpose of showing in this second offer the lines as constructed in Georgia, but for the [fol. 366g] purpose of showing the other lines outside of that territory; our position being that since the lines in Georgia are merely immaterial, that they cannot for that purpose be misleading.

Judge Allen: As a matter of fact the Court of its own motion was preparing to strike out that part of the map which related to Georgia before the other controversy arose.

Mr. Bemis: Yes, we wish, however, to make it clear in the record, we are offering it as an exhibit, with the lines shown in Georgia disregarded or stricken out, and we understand that the Court's ruling is that the objection to the map so considered is sustained, to which we reserve our exception.

Now, without waiving our exception may we present to the Court another map at a later time with corrections as the Court has indicated to meet the objections which the Court finds?

Judge Allen: The Court will be glad to see such a map.

[fol. 367] (Complainants subsequently offered and the Court received in evidence the map, Complainants' Exhibit 332-A. Such new exhibit does not show TVA lines either constructed or proposed in the State of Georgia; the legend indicates in large letters that the lines shown are constructed, under construction and proposed; and it differentiates by color between TVA lines under construction and lines proposed by TVA. Corresponding changes are made in the legend appearing on Complainants' Exhibit 332-A which conform to the testimony of the witnesses George R. Parker and M. B. Penn and conform to the ruling of the Court in excluding Complainants' Exhibit 332.)

O. J. MILLER was called as a witness on behalf of the complainants and, having been first duly sworn, was examined and testified as follows:

Direct examination:

I am 46 years old, live in Chattanooga and have been manager of the Production and Transmission Department for The Tennessee Electric Power Company for 10 years. I had my high school education at New Lyme Institute. I graduated at Hiram College in 1913. I graduated from the Engineering course in Ohio State University in 1916. I was with E. W. Clark & Company at Columbus from 1916 to 1920. I have been on statistical work, load forecast, economics of hydro and steam generation, cost and design of generating plants and locks. From 1920 to 1924, I was engineer for The Tennessee Power Company on estimates and investigations of line extensions into new

territory and estimates and locations of hydro and steam plants and developments, plans for transmission lines. [fol. 368] From 1924 to 1927, I was superintendent of production for The Tennessee Electric Power Company. From 1927 to date, I have been manager of the production and transmission department of The Tennessee Electric Power Company. I am generally familiar with the existing transmission system of the TVA as it has so far been extended. I am familiar with the principal load centers in the area accessible to this system.

The map (offered in evidence as Complainants' Exhibit 333) shows the TVA transmission system and its relation to the load centers in the general area where the transmission lines extend. The main existing load centers are Knoxville, Chattanooga, Birmingham, Nashville and Memphis; and the remaining load centers are scattered throughout the area. The exhibit shows the area in which the TVA dams and transmission lines are located, together with the principal load centers in the area within 100 miles of any of the TVA dams. The yellow circles show the loads of the complainant companies.

"Judge Allen: Mr. Miller, the Court has excluded testimony with reference to the Georgia Power Company. The Court of its own motion strikes out of the map that part relating to portions in Georgia, to which you may have your exception.

Mr. Bemis: We save our exception."

The red circles show the loads served by the TVA. The transmission lines are transmission lines of the TVA. The yellow circles with red outlines are the locations where elections have been held and a vote indicated that the people wanted to obtain a system for distributing TVA power. One square inch of area on the map in the circles indicates 100,000,000 kilowatt hours a year power consumption. The location of these various load centers are correctly shown on this map. They have been shown, concentrated for distribution purposes. The loads may be [fol. 369] located somewhat outside the circles, but the circles indicate the load centers and the size of the loads.

There are two basic engineering principles that a transmission system must meet. One, that the transmission system must give adequate service to the load. The other,

that it must permit flexible operation of the generating plants. In order to give adequate service to the load, transmission lines must extend from generating centers to load centers. There must be a sufficient number of transmission lines to give reasonably good service with a reasonable amount of equipment out of service. It must be sufficient to take care of not only present loads but a reasonable amount of future loads, and must be adaptable for extension to other load areas.

In order to satisfy the requirements of the flexibility of generating plants, it must recognize the different design of the plants, such as storage plant at Norris Dam, which may be shut down several hours of the day or several days or weeks of the year, so that its generation would vary from zero to full load. You must also take into consideration the fluctuations of the run of river plants, which will go from zero, or their minimum generating conditions under flood or low water conditions, to plant capacity. It also must be suitable to take care of the load when plant equipment is out of service from inspection, or repairs, or accidents.

The TVA transmission lines as shown on this exhibit are adequate both to suit and serve a great many of the load centers in the area shown. I make this statement after considering their lines and load centers in the light of the general principles involved in line design. They run from generating centers to load centers, as is shown by the line which runs from the generating center at Wilson and [fol. 370] Wheeler Dams to Watts Bar, where it finds its way over into the load center at Chattanooga; by the line from Watts Bar to Chattanooga, where it finds its way into the load center at Knoxville; by the line from Watts Bar to Knoxville, to Norris and from Norris via Knoxville to the Aluminum Company at Maryville; by the line leaving Wheeler Dam, running to Monsanto Chemical Company; by the line from Wilson Dam through Pickwick Dam into Memphis; and by the line from Pickwick Dam into Jackson. All of these are lines from generating centers to load centers. These lines are also adaptable for duplicate service to the large load areas which they cover. The contemplated line which they have in mind from Guntersville Dam to Chickamauga Dam, would serve as a duplicate supply to the Chattanooga load, the line from Norris to Knoxville carries a duplicate supply from Knoxville, and

the line from Jackson to Memphis would serve as a duplicate supply to both Memphis and Jackson.

As to the adequacy of the lines from capacity standpoint, I wish to say that the lines from Wheeler Dam to Watts Bar, Watts Bar to Chickamauga, Watts Bar to Norris, Norris to Maryville, from Wheeler to Knoxville, and from Pickwick to Memphis are all 154,000 volts, which is as high voltage as any lines built in the south. They are constructed of 636,000 circular mills aluminum conductor, which is the largest conductor used any place on any length of transmission lines in the south. So that all these lines are large power carrying lines. They also provide the requirements of fluctuation between generating centers, particularly for the line from Guntersville Dam to Chickamauga Dam. When completed, they will not only have one supply between most of the generating centers, they will have a duplicate supply, so they are adequate from this viewpoint.

[fol. 371] If I were to design a system to serve the existing loads in this area which are shown or illustrated on this exhibit, I would make no changes in the lines already constructed. I would add to these lines as requirements were needed for service to the loads which I would serve. This system is adapted to serve the ~~other~~ loads shown on this map exhibit.

The load at Nashville could readily be served by an extension of the line from Wheeler to Columbia and into Nashville, and a duplicate supply could be obtained at this location by its line from Gilbertsville Dam through Clarksville to Nashville. For a third source, if it was needed, it would readily be obtained by a line from Pickwick or Wheeler or Wilson. Another supply for the town of Memphis could be readily obtained by one line from Gilbertsville to Memphis. Also, the system lends itself to flexible extension to the south by lines from Wheeler Dam to Guntersville, and the load centers at Birmingham, Gadsden and Anniston.

The electric loads that are now being served by the TVA are shown on this map with red circles. If I were to design a system to serve the present loads of the TVA I would not design such a system as is shown on this exhibit, as built. I would design a completely different type of system.

I have prepared a study showing the kind of system which in my opinion would be appropriate to serve such loads.

The map (offered and received in evidence as Complainants' Exhibit 334) shows a design of a transmission system to serve the existing TVA loads. Those red circles are in the same location and of the same size as the red circles which appeared on the previous Exhibit 333. In answer to the question as to what engineering advantages there may be in the transmission system shown on this exhibit 334, this system as designed is a lower voltage system than that [fol. 372] which has been built, and the low voltage system is much more flexible to design and construct, easier to operate and maintain, and recognized by all the electric industry as the method of picking up rather small scattered loads. The system as laid out on this exhibit shows a 110,000 volt line from Norris Dam to the Aluminum Company of America load at Maryville, which line is extended at the same voltage through Dayton to Chickamauga, and a 44,000 volt line from Chickamauga Dam to serve the TVA load in North Georgia. There is a 110,000 volt line originating at Wilson Dam, running to the Monsanto Chemical Company; another 110,000 volt line originating at Wilson Dam, running to Wheeler Dam, and extending to Decatur; and another 110,000 volt line originating at Wilson Dam and running to Pickwick Dam, and is extended from there to Tupelo. The remainder of the lines are 44,000 volt lines. This system is very flexible for expanding or extending for other similar loads. This system being built of lower voltage lines is considerably less expensive to construct, as well as to operate, than the system which has been constructed. This will give as adequate service to the present TVA loads as the other system. The other system involves around 50% more miles than this system.

The map (offered in evidence as Complainants' Exhibit 335) shows the transmission lines of the complainant companies and the load centers of the complainant companies and TVA within 100 miles radius of TVA dams.

"Judge Allen: The Court at this time will make the same ruling with reference to the operation in Georgia, and you may have your exception.

Mr. Bemis: I would assume perhaps that question would arise when these are formally offered. They are all subject to that same question.

[fol. 373] Judge Allen: The Court simply wants to indicate to counsel and to the witness that we do not care to

hear any testimony on that subject, before we rule on it.

Mr. Bemis: I so understand, and we may have our exception?

Judge Allen: You may have your exception."

These load centers which are shown on Complainants' Exhibit 335 are identical to the load centers shown on Complainants' Exhibit 333.

I will illustrate by a few locations how these present load centers are being served by the high tension transmission system which is shown on Complainants' Exhibit 335. Knoxville, for instance, is being supplied by a 110,000 volt line from the Waterville generating station in North Carolina and by two 110,000 volt lines from the Ocoee, Hales Bar and Great Falls generating systems to the south. The load at Knoxville could be carried over any one of these three lines. Chattanooga is supplied by five transmission lines, one from the Ocoee generating center of 110,000 volts, one from the Hales Bar generating center of 110,000 volts, two from the Hales Bar generating center of 44,000 volts, and one 110,000 volt line from the Georgia Power Company system. Nashville is supplied by two high tension lines and a steam plant. The smaller load centers are shown in that area of The Tennessee Electric Power Company and are largely served by two lines, any one of which is capable of supplying their load center. The loads indicated by the red circles appearing in Mississippi are supplied by lines purchased by TVA from the Mississippi Power Company and, of course, there are no lines in that area now owned by the Mississippi Power Company which could serve those loads. The same is true of the loads now being supplied [fol. 374] by the TVA in North Alabama. But the loads in Tennessee could all be supplied from existing high tension systems, with the possible exception of the Monsanto load, where additional strengthening of the system would be required.

The existing transmission system of the TVA, as shown by Complainants' Exhibit 333, duplicates the existing transmission system in this area, as shown by Complainants' Exhibit 335, to the extent that it is able to carry the load centers supplied by the existing transmission system. Whenever lines are built into the Nashville load center by the TVA, they will at that time completely duplicate all of the

high tension system of The Tennessee Electric Power Company.

Assuming that the city of Chattanooga acquires a distribution system to serve the load indicated on Complainants' Exhibit 335, it would have the following effect upon the usefulness of the existing facilities, other than distribution facilities, now owned and operated by The Tennessee Electric Power Company. The load supplied to Chattanooga constitutes about one-third of the load of The Tennessee Electric Power Company. The service to Chattanooga is somewhat better than the ordinary service on The Tennessee Electric Power Company system, because it is one of the large load centers, so that perhaps more than one-third of the system of The Tennessee Electric Power Company is used for the service to the Chattanooga load. The facilities which would actually be rendered useless if the city of Chattanooga acquired a distribution system would be the transmission lines from the Ocoee generating centers into Chattanooga, the transmission line from Hales Bar generating center to College Junction, the 110,000 as well as two 44,000 volt lines, from Hales Bar generating system into Chattanooga, and the 110,000 volt line connecting with the Georgia Power Company, together with the Ridgedale sub-station, Valdeau sub-station and Carter Street sub-station at Chattanooga, a portion of the high tension sub-station at the Ocoee generating plants and all of the high tension sub-station at Hales Bar. There would also be some question as to the usefulness of a great deal of the other high tension transmission facilities of the Company. For instance, in that there would be no large load between the Ocoee generating station and the Great Falls generating center, the line connecting these two generating systems would be of questionable value. In that there would be no large load on the location at Chattanooga, the two 110,000 volt lines between the Ocoee generating system and Knoxville would be of questionable value. There would be a similar effect upon the transmission facilities in the event these other cities which are indicated should acquire a distribution system to use TVA power. They would all present different problems.

The map (offered and received in evidence as Complainants' Exhibit 336) shows the lines of The Tennessee Electric Power Company by five year intervals from 1917 to date, 1917 being shown in the upper left hand corner. The

insert below that is 1922, the lower left hand corner shows the lines as of 1927, the upper right hand corner showing the lines as of 1932, and the one immediately below that shows the lines as of 1937. This shows the electric lines of the Company, irrespective of voltage. That is, there is no distinction made in the voltages on the lines as shown. The engineering principles involved in the building of extensions into new territory as shown by this series of maps which appear on this exhibit are as follows: The transmission line is first extended to a load center. From this load center lines radiating out are constructed as customers are [fol. 376] obtained to justify the extensions. Extensions then are made into adjoining communities. Due to the load in the adjoining community, at the time the service is extended, the voltage of the line may be operated at less than that for which it was built, and as the load builds, and the service becomes more important, the voltage of the line is raised to that for which it was built. As the service grows more, or as demands are more for better service, the load grows, that line is extended until it connects with some other line to form a loop, or duplicate service to the area served. There are many problems which the engineer keeps in mind as these lines are built into new territory; the type of country over which the line is built, the right of way difficulties, exposure, the availability of customers along the line. But the most important feature facing the engineer is economics. The territory must be entered at the lowest possible expense and still with facilities that can be expanded to take care of the ultimate load in the area, and form a link in the ultimate development of the system.

This may be illustrated by an example. Prior to 1922, there was a 44,000 volt line built from Estill Springs through Tullahoma, Shelbyville, to the town of Lewisburg. Between 1922 and 1927, this line was extended to Fayetteville, and on to Petersburg, or Lynchburg. Due to the fact that the loads at Fayetteville and Lynchburg were not very big at the time, the line from Lewisburg to Fayetteville, while built for 44,000 volts, was operated at 22,000 volts. Between 1927 and 1932, the load in this area grew and service required improvements so that the line from Lewisburg to Fayetteville, up to Lynchburg, was raised to 44,000 volts, the voltage for which the line was built, and a new line built from Lynchburg back to Estill Springs, which closed the [fol. 377] loop and provided two way service to all of the

customers, which improved their continuity of service as well as their voltage. It facilitated maintenance of the line and would help take care of the overload conditions. These engineering advantages of loop construction which I have just explained apply both to transmission and distribution lines.

From an engineering point of view this process of line extensions and construction of loops is affected as follows by the construction of lines of another system in the same territory. If another system exists in the territory, there are many things which will upset the natural development of a system to form a correlated unit. It may take customers along a line between the ends of the two lines, which are needed to justify the closure of a loop. It might occupy a right of way that is needed for that loop, and for instance, highways in that section of the country are usually occupied on one side by telephone lines. If one system has the other side of the highway, the other system must necessarily get private rights of way, which increases the cost, so that the existence of two systems in the same area greatly retards the development of either system, in a correlated unit.

This may be illustrated by referring to Complainants' Exhibits 208 and 209, one of which represents the Middle Tennessee division and the other the Cumberland division of The Tennessee Electric Power Company. One of the greatest effects of two duplicating systems in the same territory, is to prevent either system from expanding in a normal way. As illustrated on Exhibit 208, it will be observed that there was a line constructed out of Lawrenceburg toward Wales. This line was constructed to be operated later as a tie between two loads, now supplied by [fol. 378] 44,000 volts, in order to improve the service and voltage of all the customers on both lines. It was built for 44,000 volts, but is now operated part way at 2,300 volts and 6,900 volts. It so happens that the system that is distributing TVA power is now occupying the area between the end of this line and the point of closure at Wales. By occupying this territory, it has taken the available customers in the territory which are needed to justify the closure, and it is also occupying one side of the highway, the other side of the highway being occupied by a telephone line, which is the usual thing in this section of the country,

so that in order to close the loop now it would be necessary to get a private right of way which would still further increase the cost of closing the loop. These are typical problems that you get into in developing a system where there is another competing system.

There are physical obstacles presented where there are two systems operating in the same general area. It will be noted from the inspection of these two exhibits that lines distributing TVA power are adjacent to and surrounding the load centers of The Tennessee Electric Power Company. This is shown at Shelbyville, Murfreesboro, Lewisburg, Columbia and other locations. The physical difficulty is to extend lines out of these load centers. It is necessary, of course, to cross the lines of the other system. We have already a great many physical crossings, such as telephone lines and railroads, all of which bring up a number of problems. There is considerable additional expense in making these crossings and while it is not a great deal for any one crossing, yet a multiplicity of crossings, as will be evidenced from a great number of extensions, would really amount to quite an item.

[fol. 379] Where there are two competing systems, there are, of course, duplicate transmission and distribution facilities. This, of course, increases the cost of serving the customers in the area. The cost is further increased by the operation and maintenance, because of the duplication of operation and maintenance forces. Neither system can develop as it normally would in a correlated unit, due to the interference of the other system, so that the final result is higher costs and poorer service.

[fol. 380] Cross-examination:

With reference to Complainants' Exhibit 333 headed "TVA Transmission Lines and Principal Load Centers", the dotted line from Memphis, Tennessee, through to Jackson, Tennessee, is one of the lines mentioned in the Second Deficiency Appropriation Bill for 1937. I am not aware whether that line is under construction or not. I have not seen it under construction, nor have I seen the line laid out or staked out. I know nothing except from the description given in the Hearings on the Appropriation Bill. I connected up the towns the best I could from the description in the Hearings. I have had no knowledge of any abandonment of the line.

I understood the original purpose for the proposed line from Wilson Dam to Columbia and I know that purpose no longer exists. I understand there were surveys made of it and other things, but I do not understand it is under construction today.

I do not know whether the line from Columbia to Nashville is under construction either. I have not seen it staked out. In answer to whether I am aware that that line was originally contemplated as a means of delivering power to the Tennessee Electric Power Co. at Nashville, I have no idea of the purpose of the line, other than what was stated in the Hearings on the Deficiency Appropriation Bill by the witness before the Committee. I do not know it to be a fact that the proposed transaction was discussed by representatives of the TVA and of The Tennessee Electric Power Company. I did not hear anything about the sale of TVA power to The Tennessee Electric Power Company, nor anything about a contract. I am manager of the Production and Transmission Department. Production refers to generation. I usually know when my Company starts negotiations for an important contract for a supply of [fol. 381] power. I heard of a discussion in relation to a contract for the purchase of power by The Tennessee Electric Power Company from the TVA at the time and prior to the time that we had any intention of building a steam plant at Nashville, but that was just a discussion and nothing final was ever arrived at. It was probably prior to the time we decided to build the steam plant that that line was proposed.

I have not seen any line under construction between Wilson Dam, Alabama, and Tupelo, Mississippi, as indicated by the dotted line on Exhibit 333. I don't know whether that line is under construction or whether it is now planned for construction.

It is my understanding that the loads illustrated on the map, Complainants' Exhibit 333, in form and color of cherries at Russellville, Alabama, Courtland, Alabama, Decatur, Alabama, and Hartselle, Alabama, are served by the TVA. In answer to whether I know as a matter of fact that the Alabama Power Company owns the distribution system in every one of those towns, I understand that they do not have any way of serving the distribution systems except through TVA lines. The TVA is delivering power wholesale to Alabama Power Company and Alabama

Power Company itself owns and operates the municipal distribution systems.

I have listed on this exhibit Watts Bar Dam as recommended, Coulter Shoals Dam as recommended, and Fontana Dam as recommended. I have put a red circle around the City of Bessemer, Alabama. I do not know whether or not the TVA has a contract to furnish power to the City of Bessemer, but this legend does not so state. I know that the TVA has no lines in the vicinity of Bessemer. I am not certain whether the same is true as regards Aberdeen in Mississippi.

[fol. 382] In using the red circle system on Complainants' Exhibits 333, 334 and 335 to indicate the cities that have voted to obtain distribution systems and distribute TVA power, I have not provided any means of distinguishing as to whether or not the TVA has contracts with those cities.

Referring again to Exhibit 333, in addition to the generating plants constructed or under construction from which TVA transmission lines now extend at Pickwick, Wilson, Wheeler, Gunter'sville, Chichamauga and Norris, the Hiwassee Dam is also under construction. The TVA does not have transmission lines from Hiwassee Dam connecting with the system.

Without taking the time to check I wouldn't know definitely but I think it is substantially correct to say that all of the load centers within 100 miles of Pickwick Dam, except the towns of Martin and Paris and except the present load carried by the TVA, are now presently served by the Commonwealth & Southern or the Electric Bond & Share companies. Taking the 100-mile radius from Wilson, Wheeler and Gunter'sville Dams, all of the load centers there which are not being now served by the TVA are being served by the Electric Bond & Share or the Commonwealth & Southern companies. That is the way I understand it as to all of the important load centers within 100 miles of Wilson, Wheeler and Gunter'sville Dams.

With the exception of the loads shown at Hazard and Kingsport, and except for four of the small towns in East Tennessee (Greeneville, Erwin, Johnson City and Morristown), the same is true regarding the area within 100 miles of the Norris Dam. The same is true regarding the

area within 100 miles of Chickamauga Dam. I have shown substantially all of the important load centers on the map. That was my purpose in making the map.

In devising the suggested system to serve the load of the TVA—Exhibit 334—I considered the existing loads [fol. 383] carried by the TVA. In answer to whether I did not provide for outstanding contracts the performance of which has not yet begun and for increased load under the same contracts, I considered increased loads in the load areas. I did consider growth of the loads and communities in which service was given. My statement was that if it was going to serve a great many of the contracts, the other system, or the system as the TVA has built it is the system that you would normally build. In answer to whether the requirements under existing contracts would require any increase or supplement, and by existing contracts, the requirements of customers who are now being served, would require any supplementary line or added capacity, the system is designed just to take care of the existing loads. I don't know just what is meant by "requirements of service now being served." My answer to the statement that some of the large industrial customers now taking service might well take two or three times as much power as they are actually taking now, would be that if those customers, or any other contracts were added, you would have to go back to the system which you have already designed and built. My design in Exhibit 334 was just laid out for the load that is presently being carried. I might explain that the size of the red circles, the area represented in these red circles, was the estimate of the loads, as was testified before the Deficiency Bill Appropriation Committee, the second one, for 1937, checked with the last report which I had of the figures of the TVA operating department. The amount of the load which was calculated for Monsanto on Exhibit 334 was 25,000 kilowatts on a fairly good load factor. I don't remember the amount of the load factor but I think it was approximately 93%. Assuming the load is 50,000 kilowatts this system as shown on Exhibit 334 would not be adequate to render reliable service; it would have to be increased to serve an increased load like that.

[fol. 384] In answer to what load I assumed was going to the Aluminum Company, the present contract serving that industrial consumer is what is known as "when, as and if" contract. I assumed that they would use the

amount of that contract, which is 20,000 kilowatts for a 6-months period to supplement their hydro generation, which to my knowledge I know drops off in the summer time, the low water period, and they need to supplement that during that period, so this is only a 6-months duty on that 20,000, as stipulated in the present agreement. That figure represents 20,000 kilowatts for six months. I have not calculated any continuous or firm power at all. The first contract, and the one they are working under now, has no firm power in it. In answer to whether, assuming the ultimate load to the Aluminum Company is 112,000 kilowatts the design of system on Exhibit 334 is adequate to render reliable service to that load, if that contract is extended or any other contract in that system is taken on, it would be necessary to build the system which the TVA has designed and built. If the ultimate load were in the neighborhood of 112,000 kilowatts you have to have substantially the type of system which the TVA has designed and built, and if you wanted to get additional power to this large industrial customer, it would be necessary to build a lot more line than what I have shown on here.

There is no power being generated at Chickamauga Dam now. I don't know how long it will be before power is generated there but it will not be for some time. As to whether I have assumed a seasonal operation of Norris so that for substantial periods of time there will be no power production at Norris, I would not know just how you would operate at Norris. But if operated like we would operate it, there would be a lot of power available during the whole year. But if it was operated to draw out Norris to supplement Wilson in the summer time, naturally that would be [fol. 385] the time when the greatest amount of power would come out of Norris. I do not know it to be a fact that if Norris Dam is operated for flood control purposes, it must be shut down entirely at times. In answer to whether I assumed on direct examination there would be a seasonal operation at Norris and whether I assumed there was firm power there, it is hard for me to say how anybody would operate a dam of that kind. I have not assumed any firm power there of any great size. There might be some small capacity there which would be firm. If the firm requirements at the Aluminum Company were hooked up with Norris Dam, and if we assumed Norris Dam is not to be operated continuously, and with Chickamauga under con-

struction, the system would not give a firm supply to the Aluminum Company of America.

Under the design of my system on Exhibit 334, I have no idea how the government will dispose of power from Hiwassee Dam, and I have made no plan as to Guntersville Dam. The same is true of Gilbertsville. I have no idea what they have in mind. With respect to Watts Bar and Coulter Shoals, I have only taken care of their present load requirements. I do not know it to be a fact that as a practical matter, if the power is not transmitted from such dams as Hiwassee, Guntersville, Watts Bar and Coulter Shoals, it could only be consumed by the complainant companies. Large industrial plants could locate at the dams and use it there. Except for that sort of load, the only substantial markets in the surrounding territory would be these complainant companies.

I have not designed a system to dispose of substantially all the power from the Wilson, Wheeler and Pickwick areas. Whether or not I would serve by means of a single line a heavy load such as that at Monsanto would depend on the customer's requirements. If the requirements were such that I could not on a single line, I would have to build two lines.

[fol. 386] I know that there is a contract for the TVA to deliver a substantial amount of power to the Arkansas Power & Light Company, to be delivered in the vicinity of Memphis. I have made no provision on my design, Exhibit 334, for that commitment to the Arkansas Power & Light Company, as that is not a present load. I would guess that the peak demand at Memphis of the Memphis Power & Light Company would be in the neighborhood of 45,000 to 50,000 kilowatts. I do not know how much power the TVA is obligated to deliver to the Arkansas Power & Light Company. If we assume that the Arkansas Power & Light Company may require a total of 40,000 kilowatts I would not think that one line from Pickwick would be adequate to serve the requirements in the Memphis area, including that load of the Arkansas Company. As to whether I think the present lines of the company are adequate for that purpose, I understand the present companies are serving the load now. I don't think there are any facilities at Memphis to deliver 40,000 by the private utilities into Arkansas, but I am not sufficiently acquainted with the situation to be sure about it.

If an additional load of around 82,000 kilowatts were brought into The Tennessee Electric Power Company's system in the neighborhood of Columbia, around Monsanto and Victor Chemical Company, it would require considerable new facilities, because that is an unusual amount of load to bring into any system. Probably it would require some additional generating capacity and transmitting facilities, because we do not try and keep a reserve adequate for taking care of any such large blocks. But those facilities usually could be added by the time that the load is ready.

The question whether, if the transmission lines of The Tennessee Electric Power Company leading from Ocoee and Hales Bar were not useful for the purpose of serving the City of Chattanooga, they would have any use in serving [fol. 387] other parts of the interconnected system of The Tennessee Electric Power Company, is a question as to whether they would be needed for the loads in other parts of the system, and my answer would be "no." The new steam plant generating facilities at Nashville are a long distance from the location of Hales Bar. Power could be transmitted from Hales Bar to Nashville, but we already have a generating plant on that line closer to Nashville than Hales Bar. In answer to whether, if we had that capacity at Hales Bar and it were idle we would not build a steam plant at Nashville, the steam plant at Nashville is wholly different. I am assuming that even if Hales Bar were idle, we would go ahead and build the steam plant or else additional lines into Nashville. It is needed at Nashville because we haven't got the transmission facilities for getting additional power into Nashville so that the plant would be needed at Nashville for Nashville service. Those sources are also interconnected with the Alabama system.

My proposed system on Exhibit 334 is the proper kind of system for the load that is shown. If I was trying to make maximum use of the dams and take on and build a load as the utility companies would build it, and take on the load in the area, I would build a system connecting dams substantially as the TVA has build it.

I do not know what per cent of the total load of the southern Commonwealth & Southern companies is represented by the City of Chattanooga, but I could figure it out. I am unable to say whether it is about 6 per cent. I don't

have any figures to verify the statement that the firm capacity of The Tennessee Electric Power Company system in October 1934 was 170,000 kilowatts but it sounds rather low.

[fol. 388] "Mr. Fly: I only voice, and I wish to do so very briefly, objections to proposed exhibits 333 and 335.

I am not sure that I can touch upon every inaccuracy in 333, but I shall endeavor to list the outstanding items.

In the first place, that is the one headed 'TVA transmission lines', etc. In the first place, the Georgia facilities, territory is covered.

And in the second place, the line from Memphis to Jackson in West Tennessee, is a line which has been abandoned. The witness, of course, is very uncertain about that.

The line from Nashville to Columbia, and the line from Columbia to Wilson, the witness is also uncertain about that. He does not know anything of any construction, and he has reason to believe there will be no construction.

The witness also leaves the line from Wilson Dam to Tupelo in about the same status.

Now, I won't argue those points, because they are the very same points that came up yesterday on the other exhibits. I certainly think, if we have to receive a map here that the witness says is only something that was at one time proposed, that should be sharply distinguished from a line which is not only proposed and recommended, but a line which has been definitely authorized in some way. We make no distinction between a line which has been authorized and a line which is under construction, they can be drawn together. We do not want to draw any fine lines there, or ask the Court to do so. But these other lines, where the Court believes they are not only actually not under construction, but no plan for them, I think they should be sharply distinguished.

Now, as a further objection to 333 and the same objection applies to 335, the legend indicates that the areas in red are served by the TVA. That includes a number of municipalities which the record shows, for example, over in Mississippi, and other places, where the municipalities own their own distribution systems. And this exhibit 333 goes so far as to indicate service by the TVA in the very distribution systems owned by the complainant Alabama Power Company.

Moreover, there is no distinction between a town like Bessemer, where we are not within 100 miles of the town, and have no contract, and a town where there is a contract for wholesale service.

[fol. 388a] The further point is made that Watts Bar, Coulter Shoals and Fontana Dam sites are placed on here with the same wording, and the witness has drawn the 100 mile circle from the mythical Fontana Dam.

I make no objection to 334.

335, has that one major oft repeated objection, it has the same confusion regarding the areas in red which purport to be served by the TVA and the same objection as to Fontana.

Now, I know the Court has had too much legal argument on these points, and I am not going to make a legal argument. I do want to make one practical observation.

This record is being piled up, it is just literally full of detailed maps, exhibits, charts, sketches and what not. Now, counsel have repeatedly said, and the Court has very properly been sympathetic with that attitude,—well, you can always point out the inaccuracies here, that goes to the weight of the thing, and if that line is uncertain you can point that out. Now, as a practical matter, I want to tell this Court, nobody—it is a matter of awfully grave concern to us, if these misleading maps go into the record, nobody in God's world will ever be able to take the time before the Supreme Court of the United States and say, operation in that town is not authorized, that town is in a different status, that should be out, so on and so on. We would not have any time to argue the case if we did have to, and we hope not to be left in such a burdensome state.

Mr. Bemis: May I ask a few questions on redirect examination with reference to the objections that have been made to it."

Redirect examination:

(On motion of defendants the testimony in the following paragraph was subsequently ordered stricken by the Court):

Referring to Complainants' Exhibit 333 and the broken line from Columbia to Nashville, I testified at the hearing before the Railroad and Public Utilities Commission of

Tennessee in connection with the application to construct a steam plant in Nashville. Mr. Muir, an engineer of TVA, appeared there and took the witness stand and testified to the effect that the proposed TVA line would be extended from Columbia to the Nashville area.

[fol. 389] My memory is that he said the line was going to be built regardless of whether a steam plant should be built by The Tennessee Electric Power Company in Nashville.

Those broken lines shown on Exhibit 333 were taken from the TVA Hearings on the Second Deficiency Appropriation Bill for 1937.

I know of my own knowledge that elections were held to acquire distribution facilities to use TVA power in those cities in Tennessee shown on Exhibit 333 with circles with red borders. The map does not purport to include all of the municipalities which may have held such elections. There may be some omitted. As a matter of fact, I notice that Etowah has been omitted and possibly there are others. The purpose of this is not to give exhaustive information in that respect, but to indicate the principal load centers where that has been true. (It was then conceded by counsel for defendants that there had been an election in the case of the City of Bessemer, Alabama.)

I didn't intend to leave the impression on cross examination that certain of the loads which I pointed out were being served by the Electric Bond & Share Company. It is the operating companies, Memphis, Knoxville and Carolina Light & Power, and also the West Tennessee. The Franklin Power & Light Company load is included as a part of the Nashville load center since it is served wholesale by The Tennessee Electric Power Company.

Referring to the red circles in northern Alabama, those are loads which the TVA is now carrying, irrespective of who is rendering the distribution service. That is true, not only there, but other locations. In other words, this exhibit is not intended to show who is rendering the distribution service, but who is supplying the electricity which is represented by those loads. The statements which I [fol. 389a] made on direct examination with reference to the red circles and the service to these particular loads are also applicable to Complainants' Exhibit 335.

The Arkansas Power & Light Company is not a complainant company. I was asked on cross-examination about

the Monsanto load and whether or not the transmission facilities of The Tennessee Electric Power Company would be adequate to serve that load. As to whether or not it is a fact that when any large load of this size and character is developed in a new area, it is not necessary to construct additional transmission facilities and strengthen existing lines in order to give service, in nearly all cases the system is not built to take on large loads in just any location, particularly the size of this. The system has to be strengthened wherever that load decides to locate.

The Chattanooga load as shown on Exhibit 335 is about one-third of the entire load of The Tennessee Electric Power Company.

Mr. Bemis: I think that is all. I don't know whether Mr. Fly has any further questions.

Mr. Fly: Yes, I do.

Mr. Bemis: With reference to the admissibility of these documents.

Mr. Fly: No, I am through with that.

Mr. Bemis: Does the Court wish to hear us as to the defendants' position?

Judge Allen: The Court is ready to rule.

Mr. Fly: I do have some other questions that bear upon one of the lines, but I don't think it is essential to the Court's ruling on the maps.

Judge Allen: The Court will proceed to rule upon the admission of exhibits 333, 334, and 335.

Mr. Bemis: Before the Court rules, may I make this statement, that these exhibits are offered in connection with the testimony of Mr. Miller and for the purpose of illustrating that testimony?

[fol. 389b] Judge Allen: Exhibit 334 is received in evidence.

The Court considers that the objection goes to the weight and not to the contents.

Mr. Bemis: I didn't understand that there was any objection to 334, if the Court please.

Mr. Fly: No, I had no objection to that, your Honor. I criticized it in great detail on cross examination, but I did not object to it.

Judge Allen: An objection was made yesterday and the Court bore that in mind.

Mr. Fly: I am sorry.

Judge Allen: We were notified that there would be strenuous objection to that.

With reference to exhibits 333 and 335, both of these exhibits are rejected. The Court bears in mind the fact that counsel prepared these exhibits prior to the Court's ruling with reference to the Georgia Power Company. The Court considers that the question of the Georgia Power Company is a question *sui generis*.

Here is a complainant who has been enjoined by a court of competent jurisdiction from seeking any relief in this case against these defendants. We think that the question of this operation necessarily stands in a class by itself. Since the Georgia Power Company is not permitted to be a party to these proceedings without violating an order of a Federal District Court which has been affirmed by the Fifth Circuit, necessarily the operation in Georgia has no relevance and no materiality here.

For that reason, the Court of its own motion will hear no testimony with reference to the operation in Georgia and will not admit any map showing the operation in Georgia.

The exhibit No. 333 is also objectionable because of the fact that the legend relates to the Georgia Power Company.

The Court has a further objection to both of these exhibits. It considers them inaccurate and misleading. The Court uses the term 'Misleading' not in the sense of a wilful misleading. There are a vast number of exhibits in this case, and from time to time the Court has ordered changes in the exhibits, and sometimes counsel have been compelled to paste legends upon exhibits already offered, and at times that has resulted in confusion. The Court is aware of that.

However, the Court considers that these exhibits are misleading in this way: The principal legend says 'TVA [fol. 389c] Transmission lines and principal load centers.' That is the principal exhibit is TVA transmission lines and their relation to principal load centers.

TVA Transmission lines in the mind of the ordinary person means existing transmission lines.

The legends in small letters, not nearly so evident to the eye as that which states 'TVA Transmission lines,' does show that certain of these lines are completed. It does not distinguish or differentiate between those completed lines and the lines under construction or proposed.

The Court thinks that the main legend of the map should indicate with reference to transmission lines of either litigant whether they are in existence, whether they are under construction or whether they are proposed. In other words, it should not indicate, if some of the lines are only proposed, that they are in existence.

The Court also thinks that in order for such a map to be accurate and not to mislead that there should be a differentiation between those lines under construction and those proposed, a visual differentiation. The Court considers that complainants are entitled to show that lines are proposed; but that the map should indicate on its face what lines are proposed, and what are under construction.

Therefore, exhibits 333 and 335 are rejected.

The Court at this time wishes to state to counsel on both sides that we expect exhibits which are rejected to be segregated in the record and to be incorporated in the record by themselves, under one classification, for the convenience both of this Court and of the Supreme Court of the United States.

You may have your exception.

Mr. Bemis: Note an exception to each of these rulings, and we would like to reserve the permission to make such corrections as it is possible to make, and then re-offer these exhibits, if we may. I would like to explain to the Court that the preparation of exhibits of this character involves a great deal of work."

[fol. 390] (Complainants subsequently offered and the Court received in evidence the maps, Complainants' Exhibits 333-A and 335-A. Such new exhibits do not show the load centers in the State of Georgia or TVA lines either constructed or proposed in the State of Georgia; they differentiate by color between TVA lines under construction and lines proposed by TVA; the legend shows in large letters that the map includes lines completed, under construction and proposed; and in illustrating the loads being served by TVA a distinction is drawn in color between loads served by TVA direct, loads served by TVA by sale to municipalities and cooperatives, and loads served by TVA by sale to the Alabama Power Company. Corresponding changes are made in the legends appearing on Complainants' Exhibits

333-A and 335-A which conform to the testimony of the witness O. J. Miller and conform to the ruling of the Court in excluding Complainants' Exhibits 333 and 335.)

Recross-examination:

When I referred on re-direct examination to the Electric Bond & Share companies, I meant the operating companies. I do not know the relationship between the operating companies and the Electric Bond & Share, but I do know there is a relationship.

The loads of Hazard and Kingsport are served by the Kingsport Utilities and the Kentucky & West Virginia utility companies. I understand that they are subsidiaries of the Appalachian Power Company.

It has been a long time since I reviewed the testimony [fol. 391] of Mr. Muir before the Railroad and Public Utilities Commission at Nashville. I am not able to state just how he came there or whom he said he came there to represent. I do not remember that he said that he came at the request of the Commission to testify concerning comparative costs. I just cannot remember. I would not say that he claimed to be representing the TVA.

I believe that both alternative delivery points, one at Nashville and one at Columbia, were mentioned in various discussions in regard to the sale of power by the TVA to the Company.

By Mr. Fly:

"Q. And you are not positive, are you, Mr. Miller, that Mr. Muir stated the Authority intended to build that line to Nashville, regardless of the transaction engaged in?

A. My memory is that the statement he made—

Q. Well, let me ask you if this is not the nearest thing to that which you heard at that proceeding:

'Q. That is the substation you were talking about?

A. Yes, sir.

Q. You said you were going to build that substation with a line from Columbia up here, a 154,000 volt line?

A. I said we could build a 154,000 volt line from Columbia to Nashville for \$445,000. That does not include the substation.'

Q. I will ask you, as a matter of fact, if that is not what you heard, and if that is not all Mr. Muir said regarding the plane of the Tennessee Valley Authority to build the line?

Mr. R. T. Jackson: I object.

Judge Allen: He may answer.

Mr. R. T. Jackson: May I ask to have the witness informed as to who is meant by "we"? It is a question picked out of a transcript, and does not reveal who is meant by "we", the Tennessee Valley Authority or who.

Q. I will ask you if that was not all he said about building that line, regardless of the discussion?

A. Mr. Fly, my memory is definitely—I do not know about those specific statements there, but it is definite that he left the impression with me that he was going to build that line regardless.

[fol. 392] Q. Would you like to look over this transcript to refresh your recollection as to whether he said anything like that?

A. It would take a long time to read that.

Q. You are not prepared to testify he stated that?

A. I said that was my impression.

Mr. Fly: If it please the Court, I move to strike out all of the witness' testimony regarding the capacity in which Mr. Muir testified, and regarding the entire incident of his testimony before the Commission.

Judge Allen: The Court at this time sustains the motion of Authority upon the ground that the witness has testified to an impression. The witness testified despite the fact that the testimony or statement read from the transcript as it was given by Mr. Muir, he states that it is his impression that Mr. Muir made the statement testified to. The Court is not going to clutter this record with impressions. You may have your exception.

Mr. R. T. Jackson: May we have an opportunity to examine the transcript?

Judge Allen: The motion of Authority is sustained as to striking out the testimony of this witness with reference to statements made by Mr. Muir.

Mr. Bemis: And we take our exception."

(The witness was excused.)

[fol. 393] Later on the same day O. J. MILLER was recalled as a witness on behalf of the complainants and, having previously been duly sworn as a witness on behalf of the complainants, was examined and testified further, as follows:

Direct examination:

By Mr. Bemis:

"Q. Mr. Miller, you testified this morning respecting your recollection of certain statements made by a witness, E. J. Muir in a proceeding before the Railroad and Public Utilities Commission, and I am now reading from Docket No. 2060 in that proceeding, which copy of the record was produced by counsel for defendants. And I will ask you to state whether or not this refreshes your recollection.

In the last appropriations hearings in Congress, they appropriated money to start Gilbertsville Dam.

And then the question:

'Yes, sir.

A. It will be necessary for the Authority to get power to Gilbertsville Dam for construction purposes. The most likely manner or route to get to Gilbertsville is right by Nashville, consequently, it would be unfair to Nashville to allocate the entire cost of this transmission line to service to Nashville.

Q. You do not mean to tell this Commission that the Tennessee Valley Authority has any intention whatsoever of building a construction line from anywhere, from a dam now finished, to Gilbertsville, for construction purposes only?

A. Yes, sir.'

Does that refresh your recollection as to what was said by Mr. Muir in his testimony before the Railroad and Public Utilities Commission?

A. It does."

The testimony just read is in accordance with my recollection. At the time Mr. Muir testified, counsel for TVA was present.

The notice (offered in evidence as Complainants' Exhibit 337) is a notice of the Railroad and Public Utilities Commission hearing at which Mr. Muir testified and is

addressed to counsel for TVA as well as The Tennessee Electric Power Company. (Counsel for TVA conceded that such notice was received by them.)

"Judge Allen: Apart from offering this particular exhibit in evidence, what do you now ask the Court to do?"

Mr. Bemis: We have offered this testimony of the witness to corroborate and confirm the statement which he made on the witness stand this morning with reference to the construction of the line to Nashville that is shown on one of these maps.

Judge Allen: And it was stricken out by the Court upon the ground that the witness had an impression?

Mr. Bemis: That is correct.

Judge Allen: And the Court does not feel that this extract which was read here adds very much to the tenuousness of the impression. The ruling of the Court will stand. You may have your exception.

Mr. Bemis: And we may have our exception.

Judge Allen: Yes.

Mr. S. D. L. Jackson: Let the record show we are re-offering all of that testimony.

Judge Allen: The Exhibit No. 337 is rejected. The Court understood from the statement of counsel that counsel for the complainants were asking the Court to reverse its position that it took this morning with reference to striking out the testimony this morning.

Mr. Fitts: I think that is correct.

Judge Allen: The Court adheres to its position upon the grounds stated.

Mr. Bemis: We save our exception to that."

(The witness was excused.)

WALTER N. FORD, having been previously sworn as a witness on behalf of the complainants, was recalled as a witness and was examined and testified further as follows:

[fol. 395] Direct examination:

I have been with the Memphis Power & Light Company for some years and for some years have been its Vice President. Prior to 1933, the relations of that Company with customers and municipalities in that area were most satisfac-

tory. Prior to 1933, there was no movement for municipal operation of public utilities in our territory. In my previous testimony I stated that shortly after 1923 the Company acquired the municipally-owned electric systems in Arlington, Germantown and Clairfield, and that the officials of those companies were anxious for our Company to own and operate these systems, and that they were the only municipally-operated systems in our territory.

The principal change in our relations with our customers during and after 1933 was in the City of Memphis, where the City notified us it was their intention to construct a municipal system to distribute TVA power in competition with the Company. The TVA stated they would make available to the City of Memphis, to the people in the City, a supply of electric power. In November, 1934, the citizens there voted in a general election to authorize the City to issue \$9,000,000 of bonds for the acquisition or construction of an electric distribution system for the purpose of distributing TVA power. In December, 1935, the City applied to the Public Works Administration for a loan or grant of \$10,000,000. This application was approved by the Public Works Administration, but was changed to a grant only, of \$3,092,000. In November of that same year, the City of Memphis made a contract with the TVA for the purchase of its requirements of power for distribution in the City of Memphis.

Since this contract, the TVA has built a transmission line from Pickwick Dam to the City of Memphis. The City has [fol. 396] announced that it would proceed with its plans for the construction of a distribution system to distribute TVA power. The City has sold \$3,000,000 of bonds which are to be used for that purpose. They have acquired substation sites and are now constructing their first substation there, through which to receive TVA power. The City has recently announced the letting of its first contract to build its distribution system in the City of Memphis to compete with us. I understand from the statements made that the construction will start in the immediate future.

"Q. When the City of Memphis completes this distribution system that you have mentioned, Mr. Ford, duplicating the facilities of the Memphis Power & Light Company to distribute power under its TVA contract, at the rates prescribed in that contract, what, if anything, will the Mem-

phis Power & Light Company be required to do with respect to its rates?

Mr. Fitts: I object to that question, may it please the Court, immaterial, irrelevant and incompetent under the ruling of the Court with respect to comparison of rates and the effect on rate levels.

Mr. S. D. L. Jackson: Now, if the Court please—

Judge Allen: The Court will permit the witness to answer in one sentence that question.

Mr. S. D. L. Jackson: Proceed.

A. We will have to put into effect similar rates if we expect to hold our business, otherwise, we will lose practically all of our electrical business and even if we did put in similar rates, or equivalent rates, the TVA rates required under the contract with the City, the company will no doubt lose the greater portion of its revenue.

Judge Allen: The Court after this will instruct as to the length of the sentence."

If the Memphis Power & Light Company is forced to adopt rates throughout its territory in competition with the TVA rates, we will suffer great loss of revenue due to the application of the rates; also, we will suffer additional loss due to the loss of customers in competition with the City. The combination of these two losses will bankrupt the Company.

[fol. 397] "Mr. S. D. L. Jackson: What, if anything, has the Memphis Power & Light Company done to attempt to avoid the effects of this competition?

A. Beginning in 1935 representatives of our company had discussions with representatives of the City, in which the company was trying to work out some plan.

Mr. Fly: I object to that as irrelevant, immaterial and incompetent.

Mr. S. D. L. Jackson: I might say, if your Honor please, we do not expect to go into this at any length. It is merely a very short recital as to the things that the executives of this company did in trying to soften the blow that they saw coming.

Judge Allen: The Court thinks that many of these questions, and particularly this specific question may be answered very briefly, in a short sentence.

The Witness: I heard it stated twice by a director of the TVA.

Judge Allen: On what occasions?

The Witness: The first occasion was a talk which was made before the Rotary Club.

[fol. 400] Judge Allen: Where was it, and when?

The Witness: At Knoxville, and again at a speech made before the Kiwanis Club, and I was present both times.

Judge Allen: The objection is sustained. The Court adheres to its ruling as to evidence of speeches not being received.

Mr. Seymour: We take exception, if the Court please. May we, before I ask the next question, say that what the witness would have stated was that immediately after the establishment of the TVA offices in Knoxville in the summer of 1933, the TVA stated it would make available to the people of the Tennessee Valley an abundance of cheap power, especially in Knoxville, because Knoxville was so close to one of its dams and transmission systems.

Judge Allen: Let the record show this testimony is excluded upon the ground that the statements purport to be contained in two speeches.

Mr. Seymour: An exception.

Judge Allen: The exception is granted.

Mr. Seymour: Let the record show that this testimony was offered in connection with the witness' previous testimony that there was a change of sentiment in Knoxville subsequent to 1933.

Judge Allen: Is there any contest over the fact that the TVA generally published its rates?

Mr. Fly: No, your Honor.

Judge Allen: Is that controverted?

Mr. Fly: The rates have been known and published generally in the official reports, and all of the contracts and everything.

Mr. Seymour: This testimony had nothing to do with the question of rates. It had to do with the question of the change of the attitude of the customers, and the public.

Judge Allen: It had to do with the offering of cheap power. The Court is endeavoring to assist counsel. Why should there be any controversy over the fact that this matter was known?

Mr. Seymour: So far as I can see, I am surprised that they should make any question about it.

[fol. 401] Judge Allen: I see no controversy over it. But the Court will not receive evidence of speeches. But since there is no controversy over this fact, certainly this man may testify now that he knew. Since there is no controversy over the fact it was generally announced that the TVA was offering power at rates—do I understand the Authority correctly, in view of its previous concessions, substantially lower?

Mr. Fly: That is right, your Honor.

Judge Allen: In every class of service, than the complainants? Then, it seems to me you don't have to get into this controversy over a speech or over the knowledge of this witness, who may testify that he knew, in view of the concession of counsel."

In answer to what, if anything, the City of Knoxville did in response to the changed conditions by the TVA being in the territory, in October, 1933, the City Council of Knoxville passed an ordinance authorizing a bond election to be held for the purpose of voting bonds to build or acquire a municipal electric distribution system to be owned and operated by the City. This election was held on November 25, 1933. The result of the election was the citizens voted in favor of the bond issue, which was for \$3,225,000.

"Q. What, if anything, did the city do, either during the campaign for this bond issue or immediately thereafter with respect to obtaining funds to carry on its plant, or build a plant?

Mr. Fly: I object to anything about the political campaign, your Honor.

Judge Allen: The witness may state in one sentence what the city did.

A. It applied to the PWA for a loan-grant.

Judge Allen: Did it secure it?

The Witness: It did later secure it. It secured it, however, not for \$3,225,000, but \$2,600,000."

That loan and grant, as I recall, was approved some time in the early part of 1934. While the Company was under this threat of competition on the part of the City with a [fol. 402] distribution system financed with Federal funds, an agreement was finally made between our Company and

Company to furnish the power requirements of the Volunteer Portland Cement Company and I received notice from the Volunteer Portland Cement Company that they do not wish to continue to receive service from my Company after January 12, 1938. Subsequent to the making of that contract, the TVA made an assignment of that contract with the Volunteer Portland Cement Company to the City of Knoxville.

"Judge Allen: The Court desires to ask the Corporation or the attorneys in certain particulars. The situation is brought to our minds specifically by testimony of this witness just before we recessed. If it turns out that the witness was basing his statements upon the testimony of certain speeches. The Court has ruled, and adheres to its ruling, that evidence of such speeches is inadmissible. The Court is going to ask counsel for complainants not to present evidence of that kind, based upon speeches. We think that you know your case well enough that that particular question does not have to be raised and your record has been preserved upon that question.

The Court will ask counsel for the Authority to concede the facts which necessarily they must concede, they con-[fol. 405] ceded here this morning that they published information concerning their rates, and therefore, the Court then ruled that this witness could testify that he knew that cheaper power rates were offered. Now, does the Authority concede that the Authority fostered the use of its power by municipalities and cooperatives?

Mr. Fitts: No, your Honor, the Authority does not concede that. I think that we would have to say that we do not concede it, because there are so many qualifications to it, that the fact is not conceded.

Judge Allen: Then, you know your case, and we think that there are times when the Authority might well not object. In other words, when we might save time if these difficult questions as to whether such and such a man was authorized, and all that sort of ramification, were not gone into.

Mr. Fitts: I think one thing could be easily stated, if it helps any; I think it was stated this morning, and that is that the Authority undoubtedly announced to the public that there was a certain amount of power available at such and such rates.

Judge Allen: Yes, we understand that that is conceded.

Mr. Seymour: And the Court has stated, of course, we have been allowed to reserve our exception to the ruling of the Court with respect to the speeches and addresses.

Judge Allen: Yes."

The TVA now has under construction a transmission line extending from Norris to the plant of the Volunteer Portland Cement Company, which is only about 2 miles from the City of Knoxville. They are also building a substation at that location, the cement plant. The TVA will supply the current direct to the Volunteer Portland Cement Company. The City, however, under the assignment of the contract, will pay the Authority at the wholesale rate and sell at the resale rate to the Volunteer Portland Cement Company, and they will only have to read the meter once a month and make out a bill. The line from the Norris Dam to the plant is about 20 miles long and passes through a section of Knox County which we have been serving for many years. I have seen the line under construction.

[fol. 406] Over the period of years that we have served the Volunteer Portland Cement Company the average load has been approximately 3,000 kilowatts of demand. The line which the TVA has built to that plant is of the 110 kv. type and has a capacity many times greater than that necessary to serve the Volunteer Portland Cement Company. Since the making of the contract between the TVA and the Cement Company, some of our other industrial customers have made inquiry as to the possibility of being served from that line.

If the City builds the distribution plant and renders service to our other customers under the contract I have stated or a subsequent contract of like nature, it would have a serious effect on our Company. We would have to reduce our rates to meet the rates charged by the City, to retain any of our business. (It was here stated by counsel for defendants that the concession respecting TVA rates were not limited to any particular complainant companies and that TVA resale rates are concededly substantially lower than the existing rates of each of the complainants.) The putting into effect of such rates, and such competitive conditions would ultimately result in bankruptcy of the Tennessee Public Service Company.

Cross-examination:

The plant of the Volunteer Portland Cement Company is about 2 miles beyond the city limits of Knoxville. The date upon which the TVA entered into the contract for service to the Volunteer Portland Cement Company was in August, 1936. On that date, my Company had a contract with the Volunteer Portland Cement Company which under its terms would expire in about a year, and we were in negotiation with the officials of that Company regarding a renewal of that contract. It is true that our Company was notified on April 20, 1936 by the Volunteer Portland Cement Company that in view of the fact that the contract would expire on October 1, 1936, under its terms, that the [fol. 407] Cement Company was considering other means of procuring power, and in that notification stated to our Company that they were considering the possibility of generating their own power or using waste steam. The Volunteer Portland Cement Company also wanted to know if I would make a much lower rate, something around the TVA rates, if they would renew the contract. It is true that they were considering several alternative methods of obtaining power, including generating their own power, and so advised us. They gave me the date on which the contract would expire but I don't recall now whether or not it was October 1, 1936. I remember making an affidavit on the motion for preliminary injunction in this matter which is printed at p. 548 of Volume 2 of the transcript of the record of the preliminary injunction in the United States Circuit Court of Appeals. I don't recall the date upon which service was to start from the TVA under the contract between the TVA and the Cement Company. I don't recall whether or not it was after October 1, 1936.

I think I was pretty much aware of the movements for public ownership of a distribution system in the City of Knoxville from 1929 until this time. I don't recall whether on November 1, 1932, the City Council of the City of Knoxville directed the City Manager to make an inquiry and study as to the cost of construction and operation of an electric power plant to serve the municipal needs of the city itself, but from time to time there has always been somebody rising up and talking about municipal ownership. That is almost perpetual motion. In answer to whether although I don't recall that incident I can testify

that there was no movement in the city for municipal ownership, I believe I said there was no serious or concerted effort along the line of municipal ownership. As to whether the resolution of the City Council was serious, I don't believe anything ever came of it.

Following President Roosevelt's statement that he was going to create the TVA, the City Council on February 21, 1933 approved a resolution for the appointment of a committee [fol. 408] to study the feasibility of a generating plant and distribution system in the City of Knoxville to serve the public. I am not informed as to the details of what the resolution of the City Council or the report of the committee stated. I recall that the power committee made a recommendation to the Council that an application be made to the TVA for the purchase of power, but I do not recall the date. I can't say as to whether the recommendation was approved by a resolution of the City Council or not. I understand that there was a recommendation made to the Council and that the Council accepted the recommendation before November, 1933. I cannot say whether it was in July, August or September, but I can say before November, 1933. I cannot recall whether it was before or after any announcement had been made as to the schedule of rates of the TVA. I recall the conference, about which I testified, in June of 1937 between representatives of the City and representatives of my Company concerning the possibility of purchasing the distribution system of my Company in the City of Knoxville. I do not recall at whose instance it was initiated. We had several conferences with the City, some of which I requested and some of which the City requested.

It is substantially correct to say that there was an agreement at one time between my Company and the TVA by which the properties of my Company were to be sold, and then that agreement fell through for various reasons, principally because of litigation, and since then there has been an effort on the part of the City to negotiate for the purchase. At the conference in June 1937, I asked the City where they could get the money to buy the system. They said they did not know. They asked me to make some definite specific offer to them as to the terms upon which we would be willing to sell. No such offer was ever made.

[fol. 409] The voltage of the transmission line from Norris to the Volunteer plant is much too high to serve directly from that line to rural customers along the way.

I am not familiar with the seal of the City of Knoxville, but what you show me looks like the signature of the Recorder. The signatures all look alike and do look like the signature of the Recorder of the City of Knoxville. (Counsel for defendants asked to have marked for identification as Defendants' Exhibits 10, 11 and 12 certified copies of extracts from the minutes of the City Council of the City of Knoxville. These were offered and received in evidence.)

Redirect examination:

Referring to the conference which I had with the City Power Committee, the Committee rather insisted that I make them an offer instead of them making an offer to purchase, and I informed the Committee that I personally was merely a trustee for the property of the Company, that the property was owned by its security holders, and that to sell the property the security holders would have to agree to such sale. Furthermore, it would be impossible for me to submit to the security holders, scattered widely, a proposition as to whether they would sell the property and to name a price, and that the more practical way would be for the City to make a definite offer, which I might then submit to the security holders of the Company for their consideration.

I informed the Committee that the security holders or stockholders would certainly want to know where the money was coming from, if the City should make an offer of any kind, and they replied they did not know where they could get the money at the moment. At that time, the [fol. 410] agreement between the PWA and the City was held up by court action in Washington, D. C., so money from that source at the moment was not available. Furthermore, the financial condition of the City was questionable. Their bonded indebtedness was very large. In fact, the City had been having a hard time meeting its obligations, the payment of interest on those bonds, even to the extent that up to the early part of this year the City employees had been paid in script for four, five or six years. Consequently, I felt the stockholders of the Company

would want to know something definite as to where the money would come from. I told them that personally I had no power to make an offer, as to myself, and for the reasons I stated, I would be willing to receive an offer of the City and transmit it to the stockholders for their consideration when they showed me some means of financing the contract.

It is substantially correct to state that the contract between my Company and the Volunteer Portland Cement Company, expired in October, 1936. That contract had a provision for an extension of its own. I have a written agreement with the Volunteer Portland Cement Company extending the contract beyond October, 1936, up to January 12, 1938. It was the notice of termination that fixed that date and the contract could have gone on beyond that date. There has never been a moment since we began to serve that company ten years ago, when we have not had some kind of an agreement and contract for service.

When I testified that the agitation in the City of Knoxville for municipal ownership of the electric distribution system was about 1933, I did not mean to fix a particular day of the week or month that that agitation started, but to give approximately when the agitation started. As I recall, there were published statements that appeared in the [fol. 411] press along about the first of the year 1933 and that a TVA or something equivalent to it was being considered and probably would be created by the President and Congress.

Recross-examination:

The contract with the Volunteer Portland Cement Company under which we are now operating is dated August 24, 1927 and contains the following provision:

"This contract shall be in effect for a period of five years from the date the consumer begins to use service, and thereafter for yearly periods until either party gives notice to the other 60 days before the end of any yearly period of its desire to terminate the contract at the end of such period."

Notice of cancellation has been given to the Company by Volunteer Portland Cement Company in accordance with the foregoing provision.

(Counsel for complainants then stated that Defendants' Exhibit 11 did not contain the full resolution of the meeting of the City Council of Knoxville and a copy of the full resolution of said meeting was thereupon offered and received in evidence as Complainants' Exhibit 373.)

(The witness was excused.)

[fol. 412] (Thereupon counsel for complainants read into evidence the deposition of the witness, A. E. Yates, which was taken before the Special Master. Counsel stated to the Court that the depositions were taken under a general stipulation that all objections would be reserved to be made in Court, except objections that went to the form of the question. The narrative statement of the deposition of A. E. Yates is as follows:)

A. E. YATES was called as a witness on behalf of the complainants and, having been first duly sworn, was examined and testified as follows:

Direct examination:

I reside in Flintstone, Georgia, and am 62 years old. I am President of the Yates Bleachery Company, a Georgia corporation with its principal office in Flintstone, Ga. Its business is the bleaching and finishing of various forms of cotton goods. In this business we require about 225 H.P. of electricity which is 225 kva. At the present time we are taking electric power from and have a contract with The Tennessee Electric Power Company.

The contract between the Yates Bleachery Company and The Tennessee Electric Power Company, (offered and received in evidence as Complainants' Exhibit 338), is dated April 13, 1937. Prior to that time the Yates Bleachery Company was purchasing power from The Tennessee Electric Power Company, and throughout the year 1937 there was a physical connection between our plant and The Tennessee Electric Power Company.

[fol. 413] I am acquainted with a man by the name of Ayres and I have known him since 1929. I recognize him as one of the gentlemen sitting in this room. In 1929 he was connected with the Wheeland Company, but in 1937 I learned from him

that he was connected with TVA. I saw Mr. Ayres in the office adjoining mine sometime prior to April 13, 1937. To the best of my recollection, it was sometime in the early part of April. My son, Mr. Ayres and myself were present at the meeting. My recollection is that Mr. Ayres called on my son and discussed with him the advisability of us taking power from TVA and presented some figures as to what it would cost us to use this power. My son then became interested in those figures and called me in and advised me in the presence of Mr. Ayres what he had to offer, and after consultation he asked Mr. Ayres to present a contract to us so that we could figure exactly what we might be able to do with it. A few days later Mr. Ayres called on me.

Several days later, Mr. Ayres came with a contract drawn up showing what he could do for us and he stated that the reason he had not been to us before was that there had been an injunction which prevented him from coming, but now that the injunction had been lifted he was in position to sell us TVA power. I asked him how they would get that power to us and he said it would come through the National Park. I told him that my understanding was that no light wires could come through the Park and he said that the Government owned the Park and owned TVA and there would be no difficulty in going through the Park, and that if we made a contract with TVA, he would get the line in for us by May 15th. At the last meeting when Mr. Ayres presented the contract, we examined it briefly and told him we would take [fol. 414] it under advisement and see what might be done. Mr. Ayres then showed us some figures which I now have in my possession as to what it would cost us to use TVA power and what it would cost us to use The Tennessee Electric Power Company's power, showing us a saving by using TVA. Mr. Ayres left me the address of T. R. Hunnicutt, Division Manager of TVA, which address was in the old Post Office in Chattanooga, Tenn., where we could mail these contracts if we accepted them. Then Mr. Ayres left and I did not see him again until this morning when I saw him in this office.

The memorandum (offered in evidence as Complainants' Exhibit 339) consists of two pages containing pencil notes which is in Mr. Ayres' handwriting and has been in my possession and in our files ever since the date of the meeting. This memorandum shows the rates of The Tennessee Electric Power Company and the total cost of power which

A. The company endeavored on numerous occasions through discussions with representatives of the City, to work out a plan whereby the company might distribute TVA power at rates lower than our prevailing rates, through its own system. These discussions finally culminated in a definite offer by the company in April, 1937, in which they offered first to reduce its—

Mr. Fly: Your Honor, I think this is clearly irrelevant. We have got enough trouble without going into all this detail.

Judge Allen: The negotiations were not successful?

The Witness: No, your Honor.

Judge Allen: All right, that is sufficient.

The Witness: I would like to qualify that, if I may.

Judge Allen: You may qualify.

The Witness: I would like to say the City has neither accepted nor rejected, nor discussed with us that offer but, on the other hand, they are proceeding with the building of the competing system.

Judge Allen: They have not accepted your offer?

The Witness: No ma'am."

Cross examination:

[fol. 398] The TVA is serving one of our customers at the present time through competition to the West Tennessee Power & Light Company, the municipality of Jackson. The West Tennessee Power & Light Company is one of our customers and therefore any loss of business of the West Tennessee Power & Light Company through the TVA competition affects our revenue.

There was no movement toward public ownership in Memphis until after 1933. Our present ordinance reserves the right to the City to compete with us, but I am not sure about the previous ones. In answer to whether there have been a number of various statutes passed before 1933 enabling the city to carry on that business, I remember one particular instance in which a statute was passed before 1933 enabling the City to carry on that business. In answer to whether I know that a committee was appointed to study the feasibility of a municipal system in 1916, there was some political agitation in about 1916, not for the purpose of municipal ownership, but for the purpose of

maneuvering the City into a position to force down the rates of the then existing companies.

I understand that since the construction of Wilson Dam and long prior to the TVA, the City Commission sent representatives to Wilson Dam to investigate the feasibility of bringing Wilson Dam power to the City of Memphis, not necessarily to be distributed by the City of Memphis, but possibly through the distribution system of the existing companies.

(The witness was excused.)

[fol. 399] R. W. LAMAR, having been previously duly sworn as a witness on behalf of the complainants, was recalled and testified further as follows:

Direct examination:

In my previous testimony I testified that I have been a resident of Knoxville and the executive head of the operations of the Tennessee Public Service Company in Knoxville for several years. Since January 1934 up to date, I have been Vice President and General Manager of the Company. For four years previous to 1934, I was Assistant General Manager of the Company.

Prior to 1933, our relations with our customers were quite friendly and satisfactory. There was no serious or concerted public movement for the construction or operation of any municipally operated systems in the territory in which we serve. The change occurred about the middle of 1933. Shortly after the TVA established their main offices in Knoxville, they informed the people of Knoxville and the territory that they would make available to the people an abundance of cheap power.

"Mr. Fly: We object to that. It is obvious that the witness has no such knowledge as that, your Honor.

Judge Allen. The objection is sustained.

Mr. Seymour: If the Court please, this man is in a position where he was brought directly in contact with the activities of these gentlemen, and is speaking about a matter of general knowledge in the community.

Judge Allen: Well, he is saying that they "informed" people they could have cheap power. Were you present when that was done?

the TVA whereby the Company would sell its properties to the TVA, with the exception of the transportation system and the 110 kv. line from Waterville to Kingsport. That contract of purchase was not consummated by reason of litigation inaugurated by some outside interests.

"Mr. Fly: I object to the conclusion as to whether or not—

A. —its—

Mr. Fly: —they were outside interests. Let's know who they were.

Judge Allen: Who were they? Who were the outside parties?

The Witness: There were 13 ice and coal companies who protested the carrying out of the sale before the hearing held in the fall of 1934 before the State Railroad & Public Utilities Commission.

Judge Allen: Well, the agreement was not consummated.

The Witness: The agreement was not consummated."

The City made a contract with the PWA whereby they were to receive \$2,600,000, 30% of which was to be a gift. The City also made a contract for securing power from the TVA. I believe it was about March 1, 1934. The Company secured a restraining order, an injunction against the City building a competing distribution system. This injunction was carried to the Supreme Court of the state, but before the Supreme Court had an opportunity of ruling upon the matter, the TVA withdrew the contract of March 1, 1934, and made another contract with the City. The Supreme Court thereupon dismissed the case, declaring it to be moot. When this suit was dismissed, the City subsequently and shortly after the dismissal of that suit, entered into a new contract with PWA and TVA substantially for the same purposes. The Company brought a second injunction suit to restrain the City from doing the same [fol. 403] thing, that is, proceeding with the construction of a competing electric distributing system. That suit was subsequently dismissed. We also filed a suit in the Supreme Court of the District of Columbia to restrain the PWA from loaning funds that have been allotted to the City of Knoxville. That case, as I understand it, is still pending, not decided.

The decree was entered in the Chancery Court of Knox County dismissing the second suit that we brought against the City of Knoxville on June 11, 1937. The power committee of the City of Knoxville, with some other officials, met with me some time in June 1937. They asked whether the Company would still be willing to sell its property. However, the City had no definite offer to make and did not know where they would get the funds. Nothing came of that. The conference was not broken up, it merely dissipated without any further action on the part of the City after we met with them.

The TVA communicated with the City of Knoxville with respect to the erection of its proposed distribution system on August 13, 1937. I am informed by the fact that I have seen a copy of the letter of Mr. Lilienthal. As a result of this letter, the City announced on October 26th that they would put out a request for bids to construct the North Knoxville unit of the distribution system in the City of Knoxville, stating that those bids should be in the hands of the City to be opened by November 30, 1937, which is today.

About 90% of the total gross electric revenues of my Company comes from the electric business in the City of Knoxville and immediate environs, what might be called the metropolitan district of Knoxville. The other 10% is covered by the business done in other communities and [fol. 404] towns outside of Knoxville. Both prior to 1933 and subsequent to 1933, our experience in that territory, so far as municipal ownership and distribution is concerned, was substantially the same as it was in Knoxville, with the exception that there has not been any attempt to actually establish municipal plants in the other towns. Attempts have been made, however, to establish rural co-operatives.

The present largest industrial consumer of electric energy served by us is the Volunteer Portland Cement Company. We receive approximately \$125,000 a year revenue from the sale of electric energy to that company. We have been serving that company about 10 years, which is about the time the plant was constructed. We are not going to be serving that customer after January 12, 1938. On August 14, 1936, I believe that is the correct date, the TVA made a contract with the Volunteer Portland Cement

it is estimated we would use, at Tennessee Electric Power rates. Below that appears a tabulation of the rates of TVA, the cost of power which it is estimated we would use, at TVA rates. On the second page there is a tabulation showing the rates and cost of power if purchased from the Georgia Power Company.

The memorandum (offered and received in evidence as Complainants' Exhibit 340) was left with me by Mr. Ayres when he was at our plant with reference to our getting in touch with Mr. Hunnicutt and it also is in Mr. Ayres' handwriting.

The form of contract (offered and received in evidence as Complainants' Exhibit 341) was left with me by Mr. Ayres on the occasion of his second visit and has also been continuously in my possession since the time it was prepared by [fol. 415] Mr. Ayres. It purports to be a proposed contract between the Yates Bleachery Company and the North Georgia Electric Membership Corporation. I do not recall any discussion we had about the North Georgia Electric Membership Corporation any more than that if we made a contract, it would really be with TVA at Chattanooga through Mr. Hunnicutt. On the occasion of the first meeting, I do not recall any conversation in regard to the North Georgia Electric Membership Corporation. I have told practically everything that transpired to the best of my knowledge at those two meetings.

Mr. Ayres said he had been over to see the Crystal Springs Bleachery in regard to a contract but found that they had already signed up with the Georgia Power Company, and he said that they could have saved considerable had they waited for TVA to have at least made a proposition.

(At this point the following took place):

"Mr. Fitts: May it please the Court, we object to exhibit No. 339. That is the rough pencil notation that the witness testified was left with him by this man Ayres, who just figured it out, as I read the testimony, it was just rough figuring on a piece of scratch paper. And we object to it first upon the ground that it is irrelevant and immaterial to the issues in this case, it being a detailed comparison of bills that would be received under the various rate schedules. Second upon the ground it is incompetent, as being hearsay and not authorized, and he simply had rough draft notes of an employee whose only showing of his connection is his

own statement that he was an employee without any showing as to the nature of his employment, or the scope of his duties, or what he was authorized to do.

Mr. Bemis: Would the Court like to see those exhibits?

Judge Martin: Mr. Fitts, it is conceded he was an employee, is it not?

Mr. Fitts: Yes, he was an employee. I do not know what the scope of his duties were.

Judge Allen: The Court adheres to its ruling with reference to rates and for that reason rejects the offered exhibit No. 339. You may have your exception.

Mr. Bemis: We take our exception. I understand the other exhibits are admitted in evidence.

[fol. 416] Judge Allen: The other exhibits are received in evidence. The Court adds this comment, that this proffered exhibit which has been rejected only goes to establish the ultimate fact which has been conceded by Authority, namely, that its rates in every class of service are substantially lower than those of complainants.

Mr. Bemis: And, of course, it was offered for the purpose of showing the solicitation and the means and methods used in making the solicitation.

Judge Allen: The ruling will stand. You may have your exception."

(Thereupon the defendants offered the cross-examination of the deposition of the witness Yates.)

Cross-examination:

I had not figured on buying any more power than we had been using since 1930 from The Tennessee Electric Power Company, which was temporarily switched off by a switch in our line because we were using our own engine, until Mr. Ayres came in and approached us at that time. We have our own power plant which we have had since 1920. It has been in use during all that time and has furnished practically all of the power for our plant, with the exception of what was bought from The Tennessee Electric Power Company. Our steam plant has a capacity of 600 H. P. There is a difference between the steam power that we used and the electric power. We have three boilers totalling 600 H. P. and we use that steam for drying cloth as well as to make power and therefore the boiler capacity is much larger than the electrical department. Our engines rate 240 KVA. That is

not always sufficient to satisfy our power requirements for the plant. I cannot tell without examining the last invoices when we last used Tennessee Electric Power Company power. The reason why we stopped using power is because [fol. 417] the production in our business slowed up and we did not need it. That was in the last two or three years. 1932 was a fairly good year. I don't remember how much power from The Tennessee Electric Power Company we used in 1932. The earlier contract with The Tennessee Electric Power Company was the only one we had prior to the recent contract and that is a demand contract for 30 kilowatts. It was not for the full amount of current, because we had to run our own power at that time. The application for a contract for electric service by the Yates Bleachery Company (offered and received in evidence as Defendants' Exhibit 13), was executed by Mr. Yates as President and by The Tennessee Electric Power Company through P. E. Shacklett, dated March 7, 1930, together with a second sheet of the electric service rates.

We have certain residences and houses that are the property of the company. During the period from 1930 to 1936, the source of electric power for those houses was from our switchboard in the engine room of the company. The line that has been furnished for this 30 kilowatts service is shown in the contract to be a 2300 volt, 60 cycle, 3 phase service. Their current comes through their wires up to our property line and from that property line we own the line on our own property to our switchboard. We have that switch so that it can be thrown in and out at our discretion. That line has been taken down in the last sixty days. When we finally started taking the major power requirements of our plant from The Tennessee Electric Power Company, it constructed a new line which is already built. It comes from Chattanooga and goes south of our plant where they have [fol. 418] three large transformers. I could not say definitely that it is an 11,000 volt line. The only thing I know is that they brought electricity to our plant and put in a transformer to give us 2300 volts, but I do not know what voltage they have over the line. The Tennessee Electric Power Company serves the company houses now. We discussed that matter with them after we had made our present contract (Complainants' Exhibit 338). We took out our distribution lines to the company houses and The Tennessee Electric Power Company built new distribution lines. We

were glad to get out from under the loss that we were sustaining by furnishing that service to the company houses. Those lines were built after the new line was put in by the Company and we received our full demand. My house and that of my son is lighted from the switchboard of our company. The power comes from The Tennessee Electric Power Company through the plant and in turn to my house and to my son's house. The Tennessee Electric Power Company has no right to say what we shall do with our power after we get it on the switchboard and I did not consult them in any way any more than I told them what they had to put in there. They did not grant us any permission orally or in writing and never said anything about our using power that way.

The letter (offered and received in evidence as Defendants' Exhibit 14) is addressed to me from The Tennessee Electric Power Company and approves the use of lighting in our plant and in my son's and my house. I didn't know anything about this letter and therefore the answer which I gave to your previous question stated the facts as far as I know them.

I have the bills for payments to The Tennessee Electric Power Company since 1930. Here is one for \$37.00, one for \$36.00, and two for \$35.00. I could not give the exact date when we shut off The Tennessee Company's service entirely, [fol. 419] but it will show on the last invoice. My best judgment is that we did not use that service after June, 1936. I don't know where the current came from. Our bills were rendered to us by the Toccoa Electric Power Company. Our invoices were all paid to The Tennessee Electric Power Company. I could not say that our service was from the Toccoa Power Company. I know very distinctly that The Tennessee Electric Power Company man came out here with their truck and read the meters. During 1936 most of our electric bills were minimum bills, we were not buying very much current. The bill under the new contract with the initial date of delivery given as May 15, 1937 (offered and received in evidence as Defendants' Exhibit 15) was received by us from The Tennessee Electric Power Company covering service from May 15, to June 21, 1937, for a total consumption of 20,700 kilowatt-hours. The bill from the Toccoa Electric Power Company covering the period up to May 21, 1936, shows only a consumption of 1400 kilowatts.

I was present during the last part of the first conversa-

tion with Mr. Ayres of the TVA. The first part of his conversation was had with my son and then my son called me to tell me what Mr. Ayres proposed. I was not present at all of the succeeding conferences or conversations. To the extent that I was not present, I was giving what my son reported to me as having been stated there. It is my best recollection that Mr. Ayres, in one of those conversations, said he would be out of town and would not be here for a day or so, and he suggested that if any questions came up as to the study of rates which he had made for us, we should keep in touch with Mr. Hunnicutt. It was in connection with that that he gave me the memorandum of Mr. Hunnicutt's name and address and also he gave that name to us so that [fol. 420] we could mail in the contract, if we signed it, to the old Post Office.

The Tennessee Electric Power Company built its new line across about 400 yards of our property. We did not get any compensation for the line crossing our property. We assumed that if we ever wanted service we could get it. I told them I wanted them to go across our property, knowing that if I ever wanted power later on I would have a better chance to get it. My son and I negotiated with the Power Company for our new power contract. I negotiated for a special rate comparable with the rate that had been suggested by Mr. Ayres.

Mr. Reed, Manager of the Chattanooga District of the Power Company, came down here and paid me a social call one afternoon and there was no discussion with reference to the power business. I had known him for over 25 years. I carried out the negotiations with Mr. Davies. I did not know anyone else connected with the company except Paul Shacklett, who is the industrial power engineer. I do not remember seeing Mr. Ayres after we signed the contract with The Tennessee Electric Power Company and I don't recollect giving him any information about the terms of the contract and I don't know if any information was given out. I did not tell anyone outside of our organization, our directors and stockholders, about the terms of the contract. It was nobody's business, the way I looked at it. I do not talk my business outside of my office, and I don't know of anyone else who has gotten this information from our office. I don't know whether The Tennessee Electric Power Company filed the present contract with the Public Service Commission.

[fol. 421] Redirect examination:

I do not know whether the Toccoa Electric Power Company was a wholly owned subsidiary of the Tennessee Electric Power Company organized for the purpose of doing business in Georgia.

"Mr. Bemis: If the Court please, I don't know what the record shows. It is a fact that the Toccoa Company was a wholly owned subsidiary of the Tennessee Electric Power Company.

Mr. Fitts: We admit that. I don't think it is disputed.

Mr. Bemis: It has been dissolved and the operations are now carried on by the Tennessee Electric Power Company."

I gave The Tennessee Electric Power Company permission to build a new line across my property in 1936 which was before the present contract with that Company.

During the period from 1930 until now, whether we used a large amount of power, a small amount, or none at all, there was a connection available for our taking power from The Tennessee Electric Power Company, so that in the event of the breaking down of our equipment we could have obtained power from the Power Company at any time by the throwing of the switch. That was why we contracted with the Power Company.

As far as I remember in my conversation with Mr. Ayres, nothing was said by him of serving my home or my son's home.

Recross-examination:

The reason for our entering into a new contract was not so that we could throw our switch and make that connection for service, because the new contract was on a different line entirely. They could not have supplied me with that much current on the old line. After the contract of 1930, until the new contract with The Tennessee Electric Power [fol. 422] Company, we had no further contract with the Toccoa Company or The Tennessee Electric Power Company. I presume the employees of The Tennessee Electric Power Company threw the switch in 1936 when we ceased to take power from the Toccoa Company. We notified them to cut the switch out and cancel the demand bill. The

service was discontinued, as I did not need the power at that time at that price. We had no further contract up to about April or May, 1937, when the new contract, Complainants' Exhibit 338, was entered into.

(The witness was excused.)

[fol. 423] MAJOR R. W. PUTNAM was called as a witness on behalf of the complainants and, having been first duly sworn, was examined and testified as follows:

Direct examination:

I reside in Riverside, Illinois, and am a consulting engineer by profession. I was educated in high school in Rushford, Minnesota, following which I entered the United States Military Academy at West Point, graduating in the class of 1913. I was commissioned in the Corps of Engineers as a Second Lieutenant after graduation. In September, 1914, I entered the Army Engineers' School at Washington Barracks, and I took a course in River and Harbor and Electrical and Mechanical Engineering and fortifications, which lasted until about the latter part of May, 1916. About 50% of that course was devoted to engineering connected with River and Harbor work. The course involved inspection of River and Harbor work in progress in the field, particularly on the Monongahela and Ohio Rivers. A part of the course in electrical and mechanical engineering was devoted to the study of the fundamentals of hydro-electric engineering, including the design and problems involved in design and location of hydro-electric facilities, and in connection with that study we had a few field inspections.

After graduation and omitting my post graduate engineering course about which I have already testified, my experience up until the year 1921 was entirely military engineering, service with troops in this country and abroad in various grades, up to and including that of Lieutenant Colonel during the war. In 1921 I was assigned to duty as Assistant to the United States District Engineer in Chicago, who was in charge of River and Harbor works there. In 1922 I succeeded to the position of United States Dis-

[fol. 424] trict Engineer for that District and held that position for the following four years.

The Chicago District included the lake harbors, at the south end of Lake Michigan in the States of Illinois and Indiana, the connecting waterways, such as the Chicago and Calumet Rivers, and Indiana Harbor Ship Canals, and the canals leading towards the Mississippi, such as the Chicago Sanitary and Ship Canal and the Calumet Sag Canal; supervision over the Desplaines and Fox and Kankakee Rivers; supervision of construction and maintenance of river improvement works on the Illinois River.

My tour of duty in charge of the United States Engineering office at Chicago involved studies of reports upon the condition and improvement of rivers and streams in that District. That included particularly a comprehensive investigation of the further improvement of the Illinois River, in connection with the resolution of Congress asking for recommendations as to its improvement. This involved a study of traffic possibilities, the methods in vogue on other waterways in the United States in connection with the development of water traffic, the possible savings, and the justifiable expenditures under a number of different conditions. The study of the Illinois River involved its development with varying flows of water. The matter was complicated by the diversion of water from Lake Michigan through the Chicago drainage canal, and the development had to be worked out on several different plans to fit in with the diversion of water which would be finally authorized for that waterway. My report was published as a part of House Document No. 4, 69th. Congress.

As United States District Engineer, I had to supervise the reparation of investigations in connection with applications for permits for power developments under the Federal Power Commission. I had general supervision over the operation of the power plant of the Sanitary [fol. 425] District of Chicago at the lower end of the Chicago drainage canal. I was called upon to make a study and report of the relative values of hydro-electric power by way of the Niagara-St. Lawrence outlet from the Great Lakes and by way of the proposed Illinois River outlet through the Chicago drainage canal.

In 1926, I was asked by the Commercial Club of Chicago to make a general plan for the future development of the

harbors and waterways in the Chicago District. To undertake this assignment, I resigned from the service, was sent to Europe for a few months and made a survey of waterway and harbor developments in the more important locations in Europe, including the Rhine, the Elbe, the Seine and Thames Rivers, and quite a few harbors. On my return from that trip, I spent some time in investigating waterway and harbor developments in the United States, particularly the Mississippi and New York State barge canal development. Then I proceeded to complete that assignment with the Commercial Club. The work took about two years, and while that was being finished up I started in business as a consulting engineer on River and Harbor works. Since that time I have handled some 60 or more projects in various parts of the country, having to do with River and Harbor developments and navigation, such as the supervision and construction of harbors on the northern end of Lake Michigan, at the mouth of the Rio Grande River, and further surveys in connection with waterway traffic at several ports, and other assignments of a similar character.

Since 1928, I have been an officer in a navigation company operating equipment in the transportation of bulk commodities on the Chicago Drainage Canal and the harbors and waterways at the south end of Lake Michigan. In that connection we operated a fleet of barges on the [fol. 426] Illinois River for about a year, hauling coal into Chicago. Our operations covered the Chicago and Calumet Rivers. In 1930, I was in charge of the operation of a fleet of barges on the lower part of the Green River in Kentucky, transporting coal to Evansville.

I am a member of the American Society of Civil Engineers; past president of the Western Society of Engineers; a member of the Society of American Military Engineers; and an associate member of the American Association of Port Authorities. I have written technical articles on navigation subjects.

With reference to the Tennessee River, about 1924, while I was still in the service at Chicago, I came down to Muscle Shoals while it was still under construction, and in general became familiar with the conditions at that location. In the latter part of 1934 and early 1935, I made a navigation and flood control study of the Tennessee River and its tributaries, and in that connection visited the works then

under construction by the TVA and Wilson Dam and several places along the river having to do with the existing water-borne commerce. In September 1936, I took a trip in a small boat on the Tennessee River, the entire length between Paducah and Knoxville. On that trip I examined the number and condition and character of the terminal facilities at various points; the class and amount of water traffic that could be observed; the various navigation improvements that had been made; and also the structures under construction by the TVA. Then in August, 1937, I made a trip by automobile to refresh my mind on a good many of these things and the various works under construction by the TVA and other places along the river.

Since July, 1936, I have spent a large portion of my time in the study of the navigation features and possibilities and characteristics of the Tennessee River. I estimate that since July 1936 I have put in the equivalent of about six [fol. 427] months continuous study. That is in addition to the studies I had made in 1934 and 1935. In the course of my studies of navigation and navigation possibilities on the Tennessee River, I have studied most of the recent annual reports of the Chief of Engineers of the United States Army; House Document 328 of the 71st Congress having to do with the general and detailed investigations of the possibilities of developments in the Tennessee River; and certain annual reports and publications issued by the TVA; also documents having to do with the improvement and flood control of the Mississippi River.

I have made a study of the low dam plan for improvement of navigation on the Tennessee River which is set forth in House Document 328, 71st Congress, which is in evidence as Complainants' Exhibit 105.

Prior to June 1, 1933, there were in existence on the Tennessee River what is known as the Riverton Lock at the foot of Colbert Shoals Canal, which is an improvement about 8 miles long and located some 225 to 235 miles from the mouth of the river; Dam No. 1 just below Florence and the Florence Canal, which is about $2\frac{1}{2}$ miles long immediately above that dam; Wilson Dam with its flight of two locks at the head of the Florence Canal; two locks of the old Muscle Shoals Canal at the head of Wilson Dam; two locks remaining and in use of the Elk River Shoals Canal a few miles further upstream on the left bank; the

Widows Bar lock and dam located about 407 miles upstream from the mouth of the river; and the Hales Bar lock and dam located about 431 miles from the mouth of the river. In addition to these visible improvements, a number of cuts and dikes and things of that character had been built.

With respect to the navigation conditions on the Tennessee River as they existed prior to June 1, 1933, there was [fol. 428] about 15 miles of channel with the least depth of nine feet that existed through Wilson Lake; about ten and a half miles of 7-foot channel of which 8 was in the Colbert Shoals Canal, to which I have previously referred, and two and a half miles in the Florence Canal; about 33 miles of 6-foot channel upstream of the Hales Bar lock and dam, and about 250 miles of 4½ foot channel, of which some 226 is in the lower portion of the river below Riverton, and the balance between Widows Bar lock and dam and Hales Bar; about 22 miles of 4-foot channel in the river between Florence and the head of Colbert Shoals Canal; above Chattanooga some 185 miles of open river navigation with a controlling depth of 1.3 feet at extreme low water; and between the head of Wilson Lake and Widows Bar lock and dam a distance of some 133 miles, a controlling depth at extreme low water of slightly less than a foot.

The general character of the improvement of the Tennessee River for navigation, as authorized by the Rivers and Harbors Act of July 3, 1930, is as described in House Document 328 and provides for a series of low dams between Paducah and Knoxville, which, when supplemented by the existing structures at Dam No. 1, Wilson Dam, Widows Bar and Hales Bar, would provide a continuous 9-foot navigation channel from one end to the other of the river.

The map (offered and received in evidence as Complainants' Exhibit 342) shows in the upper half a map of the Tennessee and its principal tributaries, showing as closely as possible on this scale the location of the low dams proposed in House Document 328, such as Aurora, marked immediately below the first site upstream from Paducah, with an indication 42.2 of approximate mileage of that particular dam from the mouth of the river. Going upstream, the additional dams are shown at the locations opposite their names with the approximate mileage from the mouth of the river in each case. The location of improvements existing as of about the first of July, 1933, are as

indicated by Wilson Dam and Lock B, and so on. In the lower portion of the exhibit, I show in two sections a profile of the Tennessee River, starting at Paducah on the left hand side of the upper section, running up to about mile 350, the right hand side of the section, and then continuing, the lower section, from the left hand side to the right hand side, to the head of the river. The vertical scales had to be exaggerated because where one inch shows 50 feet vertically, one inch shows horizontally some ten miles. That was necessary in order to show the vertical situation. The low dams are indicated in cross-hatched sections all of the way up the river. Merely for purposes of location and general comparison I have located in outline the dams recommended for construction by the TVA, and also existing improvements, such as Wilson Dam and Hales Bar.

When I say "Dams recommended for construction by the Tennessee Valley Authority", I mean the dams on the main river which were included in the report of the TVA dated March 31, 1936, to Congress. I also show a line on the approximate location of the crest of the 1926 flood and a line showing the approximate location of low water without dams merely to complete the picture. The lower line would show open channel conditions. The map accurately sets forth the data of the low dam plan as disclosed in the official report.

I computed the capacity of the low dam navigation plan for carrying commerce on the Tennessee River. I examined the plans which gave the description of the size of the structures, and from that knowing the character of the structures, it was possible to make computations of the capacity of the waterway. The capacity of the Tennessee River as a through waterway, that is from Knoxville to points on the Ohio-Mississippi Rivers, would be limited by the capacity of the locks already in existence at Wilson [fol. 430] Dam. They are small end of high lift. The practical working capacity of the waterways as thus controlled by Wilson for through navigation would be 5,960,000 tons per year.

Below Florence, the capacity of the waterway would be limited by the highest lift located in that low dam plan at Colbert Shoals, and would be on a practical working basis about 31,540,000 tons per year.

The section between Wilson Lake and Hales Bar dam would be controlled by the highest lift lock there, and that in accordance with the low dam plan would be at Beards Reef, Mile 355.8 with a capacity of 34,280,000 tons per year. Above Chattanooga, the capacity would be limited by the lock at Sherman Hill, and its practical working capacity would be 35,840,000 tons per year.

What I term "practical working capacity" is only 20% of the theoretical, which presupposes continuous operation of the locks every hour of every day throughout the year, with a full load. So that these figures I have given are only 20% of the theoretical and will be what is assumed to be a practical limit beyond which delays become so bothersome to equipment that additional locks are usually necessary.

The theoretical capacity for Wilson would be 29,800,000 tons per year. That would govern all through traffic. Below Florence, it would be at Colbert Shoals as before, 157,700,000 tons per year. At Beards Reef between Wilson Lake and Hales Bar, 171,400,000 tons per year, and above Chattanooga at Sherman Hill, 179,200,000 tons per year.

Movable wicket dams are constructed with what is known as a navigable pass, anywhere from 600 to 800 feet in length. This pass is so arranged that it can be practically folded down to the bottom of the river when stages are sufficient in the river to provide project depths without the use of [fol. 431] dams. And when these stages reach this point these movable wickets, which are composed of planks, practically, each one of which is hinged and may be lowered separately to the bottom of the river, are lowered and it is unnecessary then to utilize locks in passing from one section of the river to the other. It provides open river navigation for that time when the stream is at an adequate stage of the water.

In my estimate of the capacity of the low dam plan of improvement for carrying commerce on the Tennessee River, I made no allowance for open river navigation. In an average year, open water navigation would be available under the low dam plan, other than at places such as Wilson, already in existence, up to 67% of the time, depending upon the location of the particular dam in the river.

If I had made an allowance for open river navigation with the low dam plan, there would be no calculable limit on the amount of traffic that could pass during the season of open

river navigation. The limitation would be applied during the season when the dams were up. And then they would have the annual capacity rate that I gave.

Referring to the low dam plan providing a 9-foot channel on the Tennessee River, the lock and dam which would require the greatest amount of water for navigation purposes at extreme low water, and assuming a lock was used to its theoretical maximum capacity, would be at the location of the present Riverton Lock at the foot of Colbert Shoals, the lock with the highest lift. Assuming that that lock was used to its theoretical maximum capacity, about 1360 cu. ft. per second would be required for navigation purposes at extreme low water. About 1,000 cu. ft. per second would be used for lockages and 360 would be used for taking care of leakage, evaporation and the operation of the [fol. 432] small turbines that work lock gates. The extreme low water flow in the vicinity of the head of Colbert Shoals is about 4350 cu. ft. per second, which would be several times what is required for navigation.

No headwater control is necessary under these conditions to provide water for the maximum operation of the low dam navigation plan, as the natural flow of the river is more than ample.

I made a study of the cost of the low dam plan of improving the Tennessee River for navigation. The estimated cost of the low dam plan for navigation purposes, as reported to the Congress by the Corps of Engineers of the United States Army was \$74,709,000. I believe that to be a reasonable estimate. I also made an estimate of the annual maintenance and operating costs of the low dam navigation plan. I made a study of the various elements entering into the maintenance and operating costs and estimated the costs. Exclusive of Wilson Dam and Dam No. 1 and Hales Bar, which are common to any plan, I estimate the costs of maintenance and operation of the low dam plan to be about \$1,580,000. per year. This estimate of \$74,709,000. as the cost of constructing the low dam plan included locks 600 ft. long by 110 ft. wide throughout, wherever new structures were to be built.

I have also made a study of the amount of prime electric power which would be produced by the construction of the low dam plan. I estimate that about 4400 kilowatts of prime 100% continuous power would be available at the

location of Dam No. 3, which is the location of Wheeler Dam. That would be a dam about 15 feet high and would produce about that amount of continuous power. Any other power which might be produced would be secondary power. Very probably at each dam small hydro-electric units would be installed to provide power for the operation of the locks where movable dams are used. This means that stand-by sets must be installed to take care of the times when the dams are lowered, and the power cannot [fol. 433] be generated, and roughly about 5,600 horse power would be involved of secondary power for all of the low dams in this project.

I have examined the report of the TVA to Congress, under date of March 31, 1936, Complainants' Exhibit 328. That includes the 7 main river dams and 3 tributary dams. The main river dams beginning at the one farthest down stream and their normal lifts are as follows: Gilbertsville, 55 ft.; Pickwick, 56 ft.; Wheeler Dam, 50 ft.; Gunter'sville, 39 ft.; Chickamauga, 56 ft.; Watts Bar, 63 ft.; and Coulter Shoals, 65 ft. Then on the tributaries, high dams were included, Norris on the Clinch River, Fowlers Bend on the Hiwassee and Fontana on the Little Tennessee River. This plan includes certain existing structures, just as certain existing structures were included in the low dam plan of the Army Engineers. Wilson Dam and Hales Bar dam would be included in the program.

The map (offered and received in evidence as Complainants' Exhibit 343) shows the upper section of the Tennessee River and its principal tributaries, and the location of structures recommended by the TVA in its report to Congress of March 1936, such as Gilbertsville, with the approximate mileage from the mouth of the river as indicated. I have indicated opposite the names of those not under construction by a conventional sign, which under the legend is explained as "recommended for construction", and that legend applies to Gilbertsville, Watts Bar, Coulter Shoals and Fontana. In the lower section, I have a similar profile to that in the previous exhibit, except that in this case the dams in the recommended plan of the TVA are cross-hatched in blue to bring them out more prominently. The low dams are shown and included in the area of the high dams. I have given certain water levels at the approximate elevation of the 1926 flood, and with-

out dams, and also used that in the pending design of the [fol. 434] outline of existing structures, which will be common to both plans and will not be displaced by either plan. That includes Wilson Dam and Hales Bar. Complainants' Exhibit 343 accurately shows the data with reference to the recommended plan which is set forth in the report of 1936, upon which it is based.

I have calculated the capacity of the navigable channel which would incidentally result from the completion of this high dam program which is the plan included in the report of the TVA to Congress on the Tennessee River. As a highway for river transportation between Knoxville and the Ohio River, the capacity is as limited by the locks at Wilson Dam to be 5,960,000 tons a year, the same as with the low dam plan. These capacities are practical working capacities. For the section of the river below Florence, the capacity would be limited by the lock at Pickwick Landing, which would be 26,230,000 tons per year. For the section of the river between Wilson Lake and Hales Bar, the capacity would be limited by the Wheeler lock, which would be 9,520,000 tons per year. Above Chattanooga, the capacity would be limited by Coulter Shoals to about 8,900,000 tons per year. As in the previous case, these are 20 per cent of theoretical working capacities. The theoretical capacity for Wilson Dam would be 29,800,000 tons per year; at Pickwick Dam it would be 131,400,000 tons per year; at Wheeler Dam 44,500,000 tons per year, and for Coulter Shoals, 46,500,000 tons per year.

The capacity for through traffic between Knoxville and points on the Ohio and Mississippi River- would be the same on the channel incidentally resulting from the TVA high dam plan as that which would be provided by the completion of the low dam plan, because of the limitations imposed by locks at Wilson Dam which are now in existence and which are a part of both plans. For the river [fol. 435] below Florence, the capacity, in accordance with the TVA plan, would be 26,280,000 tons per year for the high dam plan and 31,540,000 tons per year for the low dam plan. For the section above Wilson, the capacity of the TVA plan would be 9,520,000 tons per year compared with 34,280,000 tons per year for the low dam plan. And above Chattanooga, the capacity, according to the TVA plan, would be 8,900,000 tons per year, and for the low dam

plan would be 35,240,000 tons per year. These figures are practical working capacity in each case.

The navigable capacity of the waterway resulting from the TVA plan would be smaller than the capacity of the low dam plan, due to two reasons: In the first place, the locks in the TVA plan are much higher, and then the locks in the TVA plan above Wilson Dam are much smaller than those in the low dam plan. The locks for the TVA plan being 60 feet by 360 feet, and the low dam plan 110 feet by 600 feet, so that larger tows can go through at a greater rate of speed, thus increasing the capacity of the low dam plan as compared to the other.

Excluding Wilson Dam, the estimated cost of the TVA plan as set forth in the table at Page 403 of the Hearings of the House Appropriations Committee on the Second Deficiency Appropriations Bill for 1937 (Complainants' Exhibit 116) would be \$473,649,650.

I have calculated what I believe to be the minimum annual cost of maintenance and operation of the TVA plan from the point of view of navigation alone. From the standpoint of navigation alone, I believe the annual maintenance and operating cost of the TVA plan to be \$994,000 a year. This includes the cost of operation of locks, their repairs, any dredging that might be necessary and the allocation of the cost of the maintenance and operation of reservoirs and dams as chargeable to navigation.

I have calculated the amount of prime continuous power which was available at Wilson Dam before the completion [fol. 436] of any of the other structures included in the TVA plan embodied in the report of 1936, which under those conditions was about 28,000 kilowatts. I ascertained from these reports the estimated amount of prime or continuous power which would be available from the completion of the TVA plan embodied in the report of the Directors of March, 1936, to Congress, which stated that 660,000 kilowatts of continuous power would be available. That excluded the Sheffield steam plant, but included such prime power as was available at Wilson Dam before the completion of any other structures.

The factors which determine the theoretical efficiency of a navigation channel are those involved in minimum widths for safety and maneuverability, maximum curvatures for the same reason, minimum depths, maximum widths, maxi-

mum current velocities, the elimination of lockages, of lost time as the result of lockages, an adequate water supply during low water seasons, a direct as against a circuitous route, and an absence of excessive depths. The channel should be wide enough so that the type of equipment for which it is designed and which it is expected will use this waterway will have no difficulty in passing other equipment in the channel and the width should also be sufficiently great to allow a substantial factor of safety against grounding on either side. The width of the waterway should be limited so that hazards and delays will be reduced to a minimum resulting from wind or wave action on waters of excessive width. That has peculiar application to inland water transportation equipment, because of the fact that modern inland water transportation is handled by equipment which is adapted to comparatively narrow bodies of water. The curvature should not be so great that it will restrict the size or speed of tows or equipment using the waterway. The depth should be sufficient so that vessels loaded to the project depth will not run any risk of ground-[fol. 437] ing and sufficient to eliminate frictional resistance to navigation offered by the bottom of the channel. Excessive velocity may introduce hazards and also restrict the speed of the vessels or tows going upstream, and operate to cause a loss of time because it is not possible to take full advantage of the added velocity or speed going downstream.

It takes about 20 minutes for a lockage, depending upon size and type of lock, so that a perfect waterway would have no locks at all. The elimination of time lost through lockages is sought either by decreasing the number of locks or providing for open river navigation.

By circuitry is meant the ratio of water distance between two ports and the corresponding land distance; and if the waterway were 100 per cent perfect, these distances would be equal. The inspection of that map (Complainants' Exhibit 343) shows the curvature between Knoxville and Paducah as a factor in connection with any waterway use by way of the Tennessee River.

For open river navigation, the water supply must be ample to fill the channel to the projected width and depth at all times, low water and high water. Otherwise, where navigation is provided through locks and dams, the water

supply must be sufficient to provide for water used for lockages, for leakage, evaporation and the operation of any power facilities to manipulate the locks. In the case of slack water navigation channels, additional water is not of significance to navigation.

Depths beyond those necessary to eliminate bottom friction, that is resistance of a tow to movement over shallow water, are of no value to navigation and in fact become a hazard when they become excessive. When accidents occur, as they inevitably do, it is the practice to ground the damaged vessel as soon as possible, and in deep water this becomes increasingly difficult, and furthermore, where vessels founder in waters of excessive depth, salvage operations are [fol. 438] more difficult, sometimes impossible and certainly more expensive.

Such factors are usually considered by engineers in designing or determining the economic feasibility of a waterway. Such theoretical efficiency, however, is not attainable in the design of works for the improvement of a waterway like the Tennessee River. I have calculated the theoretical efficiency of the waterway which would result from the execution of the low dam plan and have made similar calculations with respect to the waterway which might result from the TVA plan. I analyzed both improvements from the point of view of lost time due to lockages, excessive current velocities, inadequate channel dimensions, and lost time due to wind or waves on wide waters, and from other causes, and applying the circuitry factor which I previously explained, I find that the total lost time as compared with the hypothetically perfect waterway in the case of the low dam plan would be 32.6% of the theoretical total, giving this waterway an efficiency compared with the theoretically perfect waterway of 67.4%. With the channels resulting from the TVA plan, I find total losses of 29.4% as compared with the perfect waterway, giving that waterway an efficiency of 70.6% compared with the perfect waterway. The theoretical difference is 4.75%, if you express the waterway produced by the TVA plan in terms of the waterway that would be produced by the low dam plan. The arithmetical difference is 3.2%.

The theoretical difference has no practical significance, because while it is possible to evaluate lost time due to these various causes I have mentioned, I know of no way of evaluating the disadvantages inherent in the TVA plan in the

way of the excessive wide waters causing loss of property possibly and life in cases of storms, increased insurance rates on equipment and cargo, and I am certain that these will offset any small theoretical difference in efficiency.

[fol. 439] In computing these theoretical efficiencies of waterways, I assumed the existence of a substantial volume of traffic carried in equipment such as that which now uses the Ohio-Mississippi Rivers. But aside from that assumption, these efficiencies are independent of the volume of the traffic up to the time the practical working capacity of either waterway is reached. In computing these theoretical efficiencies of the two navigation channels, I made no allowance for the excess capacity which I found would be provided by the low dam plan.

No expenditure would be justified by any increased benefits to navigation on the Tennessee and Mississippi Rivers which might exist in favor of the channel resulting from the TVA high dam plan over the channel resulting from the low dam plan for the reasons I previously gave, that the effect of wide waters offset any theoretical advantage which might exist otherwise. I have computed the excess of the estimates of cost for the TVA high dam plan as submitted in its reports to Congress, over those for the low dam navigation plan, and have found that the TVA estimate is some \$399,000,000 greater than the estimate of cost for the low dam plan.

I have made a study to determine the nature and amount of existing commerce moving by water on the Tennessee River, by examining the annual reports of the Chief of Engineers and by actual personal contact with conditions on the river studied existing commercial developments there. I have also made a general study of the natural resources of the Tennessee Basin. Between the years 1927 and 1934, the annual commerce on the Tennessee River has varied between a minimum of 800,000 tons a year to a maximum of 2,600,000 tons a year, averaging about 1,750,000 tons a year. The average haul was about 23 miles during that period. About 82% of the total movement consisted of sand and gravel; about 9% of it of various forest products, such as lumber, ties, poles and posts; and the remaining 9% consisted of miscellaneous commodities, such [fol. 440] as iron and steel and lime and cement, and things of that character. The largest portion of the movement of lumber and forest products is from Riverton Lock on down-

stream to Paducah. There is no movement of iron and steel of any significance except as recently reported in connection with the installation of equipment in some of the dams under construction by the TVA. The old movement that existed from Sheffield is practically gone, if not entirely so. The minimum value of the material hauled on the Tennessee River during this period, 1927 to 1934, was \$5,600,000, and the value at the maximum high was about \$19,000,000, averaging slightly in excess of \$11,000,000 a year.

The chart (offered and received in evidence as Complainants' Exhibit 344) is based upon data taken from the annual reports of the Chief of Engineers of the United States Army. The chart shows the traffic existing on the Tennessee River during each calendar year from 1927 to 1934. (At this point the Court stated that it was a very simple chart and the Court could readily understand it without further explanation.) This commerce that was analyzed from 1927 to 1934, about 1 $\frac{3}{4}$ million tons, was divided so that below Riverton the average movement was about 625,000 tons, between Riverton and Brown's Island about 154,000 tons, from Brown's Island to Hales Bar about 340,000 tons, between Hales Bar and Chattanooga 117,000 tons, and above Chattanooga 652,000 tons. The sum total of that is about 140,000 tons in excess of the total movement for the year, and that covers the movement between sections which involves a certain amount of duplication in the figures. The statistics list them both by sections and then eliminating duplications they give the total.

The chart (offered and received in evidence as Complainants' Exhibit 345) is based partly on information obtained from the annual reports of the Chief of Engineers for the period studied and partly on the basis of personal [fol. 441] observations made in the field with reference to the distribution of water traffic. It shows the approximate distribution of the average freight movement on the Tennessee River from 1927 to 1934, inclusive. On the lefthand side is a set of figures running vertically which represent the number of tons of commerce. The figures on the bottom of the exhibit reading from left to right are the miles upstream from the mouth of the river, so that if at any one particular point such as Decatur just above mile 300, if you desire to know the approximate amount of traffic in the

river at that point, by reference to the scale at the left or the figures shown there, it is indicated that about 69,380 tons a year on the average move at that point, the larger portion of which is sand and gravel and the balance being forest products. A similar explanation would apply at any other location as to the different commodities indicated. Referring to the diagrams shown as sand and gravel, they show that during that period the sand and gravel movement was very largely a local movement, only moving a short distance. By relating it to the miles of the scale on the bottom of the chart, you will see that the approximate distance that sand and gravel was hauled above Paducah would be between 10 and 20 miles. In each instance the distance between the vertical lines indicating the kind or the particular commodity moving on the river shows the stretch or reach of the river over which that commodity moves or to which it is confined.

Whether or not a proposed navigation improvement is economically justified depends upon whether the transportation savings resulting from the use of that waterway by existing or reasonably prospective commerce will exceed the fixed charges on the cost of improvements, plus the annual maintenance and operating costs. Those are the factors that are established by the Corps of Engineers in reporting upon such projects.

Referring again to Complainant's Exhibit 345, the movement of sand and gravel during the period 1927 to 1934, [fol. 442] inclusive, took place entirely below Gilbertsville, the lowest of the proposed dams included in the plans submitted by TVA to Congress. That is a historical movement that I am showing there.

I have computed the approximate annual savings resulting from the use of water transportation instead of land transportation for the commerce now using the Tennessee River. I estimated the cost of land transportation necessary to move the traffic shown in this exhibit and I also estimated the cost of hauling it by water under present conditions. And I found a result which showed the annual savings in the way of transportation costs. The savings on the basis of the 1927 to 1934 traffic averaged approximately \$2,000,000 a year. That is the transportation savings on existing traffic. A capital expenditure of about \$28,600,000 would be justified to provide navigation facilities for handling present commerce on the Tennessee River.

In arriving at that figure, I allowed $3\frac{1}{2}\%$ for interest charges on the investment, $1\frac{1}{2}\%$ for depreciation and 2% for maintenance and operating costs, making a total annual cost of 7%. And capitalizing the total annual savings of \$2,000,000 at 7%, the justifiable capital expenditure comes out not to exceed \$28,600,000. That is a standard and accepted method of determining the economic feasibility of a waterway improvement.

I have also investigated to determine approximately how much money has been expended for the navigation facilities existing on the Tennessee River as of June 1, 1933. The capital expenditures prior to June 1, 1933, for navigation purposes on the Tennessee River are about \$24,600,000. The additional expenditure justified for navigation facilities by the present commerce on the Tennessee River would be the difference between \$28,600,000 and the \$24,600,000 figures that I have given, or \$4,000,000.

I have made a study to determine the nature, extent and value of the commerce which may reasonably be expected [fol. 443] to utilize the 9-foot navigation channel when and if such a channel is completed between Paducah and Knoxville. I have examined the rail movement into, out of and across the Tennessee Valley for the year 1926, for which year I was able to obtain very complete records. I found on further examination that the year 1926 was a peak year up to and including the 1935 year in the way of traffic in the region. I found further that in the general commodity subdivisions, 1926 was a peak year. On the basis of the 1926 figures and experience with water transportation and land transportation costs, I was able to determine or make an estimate of the future traffic for the Tennessee River for from 20 to 30 years in the future.

In the next 10 to 15 years after completion of a 9-foot channel between Paducah and Knoxville, I estimate the existing traffic will average 2,907,000 tons additional. Beyond that period I estimated a further increase over another period of equal length of 2,115,000 tons. So, I figure a total increase up to the end of a possible 30-year period of slightly over 5,000,000 tons in excess of existing annual traffic.

I found that the War Department in 1926 had assembled very complete traffic statistics on the area, more complete than could be found elsewhere or for any other time. And

I made a study of the cost of rail transportation in the region. I made a study of the costs of water transportation on the proposed 9-foot channel. I made allowance for extra terminal costs that might be involved in handling water traffic as against rail traffic, and examining some 9 and a half million tons of commerce contained in the War Department's report, I arrived at the conclusions that about 5,000,000 tons of that would move in the next 30 years. I also computed at the same time my estimate of the amount of savings that would be realized in transportation from this prospective movement, and for the first 10 to 15 year period I estimated that the savings for the additional traffic would amount to \$1,367,000 a year; for the second [fol. 444] 10 to 15 year period, that the savings would be increased by \$1,812,000 a year, making a total increase in savings of \$3,180,000 a year.

The estimated savings on this amount of potential commerce, which I derived from my investigation, were comparable with experiences elsewhere. I found an average saving of about 63.3¢ per ton to be realized on this traffic, and that is comparable with experience elsewhere. I found the traffic divided itself into two general classes. The first class might be defined as port-to-port traffic, that is, commerce which would move from one city directly to another with no long land hauls involved and possibly only short switching or trucking operations at each end. That sort of traffic usually develops first when a waterway is improved. So I segregated that and figured that would come within the first 10 to 15 years after the development or completion of the waterway. That is the basis for my first set of figures of 2,907,000 tons. The other traffic is known as rail and water interchange traffic, for instance, traffic originating in the interior and going by rail to the river port, transferred to the river carrier and carried to the destination either by water or a combination of rail and water. In view of the complicated nature of that class of traffic, I estimated that would develop later. For that reason, I separated the estimate into these two different periods. The latter traffic involves duplicate handling charges that are not involved in the other class of movement.

Assuming that in accordance with my estimates, river traffic will increase by 5,000,000 tons or a little better, with

a total saving of \$3,179,000 per year within a period of 30 years after the completion of a 9-foot navigation channel on the Tennessee River, the justifiable investment in navigation facilities under those conditions would be between \$35,600,000 and \$48,000,000, depending on the type of improvement.

[fol. 445] That takes into consideration the annual maintenance and operating cost factors. There is a different factor for the annual maintenance and operating cost with the low dam type of construction, in which case the annual maintenance and operating costs are about 2%. With the TVA type of construction, the amount of maintenance and operating costs chargeable to navigation is about .2% of the total expenditure, so with the low dam plan the savings are capitalized at 7% and with the TVA plan the savings are capitalized at 5.2%, making the difference. In each case the cost exceeds the investment justified by the estimate of savings. With the low dam plan the cost exceeds the justifiable investment by about \$39,400,000; with the TVA plan the cost exceeds the justifiable investment by about \$425,650,000.

The chart (offered and received in evidence as Complainants' Exhibit 346) shows a comparison of the low dam plan and the TVA plan, on four different items. The first item is the comparison between the additional investment justified by the savings previously testified to. On the left hand side for the low dam plan there is shown graphically to scale 35,600,000; on the right hand side there is shown to the same scale \$48,000,000. Then the next large block contains the capital cost involved in the two different improvements. These are to scale. For the low dam plan it shows \$75,000,000; for the TVA plan, \$473,600,000. The next block shows the excess of cost over the justified investment, which is really a difference graphically between the items shown in the second block from the top and the items shown in the first block. The bottom block shows graphically to scale the additional prime power in kilowatts at 100% load factor brought into existence as the result of the execution of these two plans—4,400 kilowatts for the low dam and 632,000 for the TVA Unified Plan. The 632,000 kilowatts shown in the bottom column on Complainants' Exhibit 346 is the difference between the 660,000 kilowatts shown [fol. 446] in the TVA plan as reported to Congress, which

will be the total amount of 100% prime power available after the execution of the TVA plan and the amount available before the TVA plan was executed, that is 28,000 estimated for Wilson Dam. I subtracted the Wilson Dam power previously existing.

The elements which enter into flood damage to navigation on the Tennessee River are those resulting from excessive current velocities which may cause a suspension of navigation during excessive floods at certain critical locations, or may cause the reduction in speed, or increase the time of round trip for the vessel, due to the fact that the additional speeds going down stream may not be safely made use of. Then there is the element of the interference or possible suspension to navigation during excessive floods when the waters of the river are sufficiently wide to create conditions where winds and waves may interfere with the operation of river equipment. And then excessive floods may suspend operation at some of the terminals on the Tennessee River.

I estimate that the average annual flood damage to existing traffic on the Tennessee River is approximately 25,150 a year. The construction of the TVA plan as submitted to Congress in its report of 1936 will eliminate a part of the flood damage to navigation resulting from excessive current velocities. It will eliminate a part of the interference with terminals. To the extent that it affects those conditions, there will be a reduction in the loss of practically \$10,100 a year. It will aggravate the condition insofar as wave action on wide waters is concerned, because in extreme floods, with the pools behind the dams filled to their extreme limits, much wider waters will be experienced on the lower sections of the river than would be the case in a state of nature, so that I believe that that situation, coupled with the fact that one or two of the terminals at least will have to be moved in connection with the execution of the TVA plan to get them [fol. 447] up above pool levels, will offset the savings in the other direction. In my opinion, no capital expenditure is justified by reason of benefits to navigation from the standpoint of decrease in flood damage to navigation.

On completion of the TVA Unified Plan as set out in their Report of March, 1936, any enrichment of low water flow by regulation from tributaries will be of no value to navigation, as the channel dimensions will be provided by

slack water methods and the natural flow of the water is ample to take care of what is necessary for lockage, leakage and use for navigation purposes. I have already testified with respect to the low dam plan that it will be $2\frac{1}{2}$ times greater than will be required for commerce. Assuming the carrying out of the TVA Unified Plan as set forth in its Report to Congress in March, 1936, navigation from the Ohio River to Knoxville will be entirely slack water navigation, because the Ohio River itself is a slack water project at the mouth of the Tennessee. That will make slack water from the mouth of the Tennessee up to the first dam.

Norris Dam has no value to commercial navigation on the Clinch River above the dam. The pool behind Norris Dam will have a maximum vertical fluctuation of between 95 to 100 feet. It will have a normal fluctuation of between 60 and 70 feet, and fluctuations of as great as 75 feet will not be unusual. Any local commerce handled on the Clinch River above Norris Dam would have to be provided with terminal equipment so arranged as to overcome these great differentials in vertical lifts, and in my opinion the expenses involved would be so great as to eliminate the possibility of any commercial navigation above the dam, except as the dam itself is a barrier to land transportation and might require it to resort to the use of ferries to cross the reservoir back of the dam.

Norris Dam has no value with reference to through commercial navigation on the Clinch River. Any through [fol. 448] navigation would be subject to the same terminal difficulties in Norris Lake that local navigation would have. Furthermore the dam itself as now built is an obstacle to through navigation. It has no locks or barge lifts or any other means for the transfer of vessels or cargo from one side of the dam to the other, so that as built, Norris is an obstacle to development of through navigation on the Clinch River.

Norris Dam can have no permanent value to navigation on the Tennessee and Mississippi Rivers under those conditions. The cost of Norris Dam, according to the estimates of the TVA, was approximately \$36,310,000. In my opinion, taking all factors into consideration, Norris Dam has no value to navigation on the Mississippi, Tennessee and Clinch Rivers. Fowler's Bend Dam will have no permanent value to navigation on the Mississippi, Tennessee and Hiwassee

Rivers for the reasons similar to those given in connection with Norris Dam. Fontana Dam could have no permanent value to navigation on the Tennessee and Little Tennessee Rivers for the same reasons.

In my opinion the TVA Unified Plan for the Tennessee River as submitted to Congress in March, 1936, is not designed primarily to promote navigation on the Tennessee River and its tributaries. Any improvement designed to promote navigation on the Tennessee River and its tributaries would not necessarily or otherwise create the chain of lakes such as resulted from the completion of Wheeler Dam and such as will result from the completion of the other dams; a chain of lakes which are of such nature as to introduce delays and even hazards to navigation. A waterway designed primarily for navigation would avoid any such arrangement of wide waters, so that if the reverse actually is the result, then in my opinion the TVA plan was not designed with that primary purpose in view. Then we have here a case of an expenditure nearly six times as great as that necessary to accomplish the primary objective. And [fol. 449] furthermore, I don't believe that the TVA Unified Plan is integrated with the navigation developments on the rest of the Ohio and Mississippi River systems.

The navigation projects of the Federal government call for the completion of 9-foot channels on the Ohio and upper Mississippi Rivers. Those channels are quite similar to the channel which would be provided by the low dam navigation plan and call for the use of the same type of equipment which has been in use on the Mississippi and Ohio Rivers for a great many years. The TVA Unified Plan would not fit into that development of the Ohio and Mississippi Rivers, because the standard Mississippi River equipment or Ohio River equipment would find it more expensive at least, if not hazardous, to operate on this chain of lakes. I am comparing the TVA channel with the Ohio and Mississippi. The equipment now in use on those rivers would have to either load more lightly or be reconstructed or redesigned to stand the wave action to be encountered, and the result would be a heavier type of equipment which would find difficulty in competing with the lighter equipment now in use on the other river systems.

Cross-examination :

I have been a witness in three recent cases involving dams and navigable streams. I was a witness against the government in each case. I made some little investigation of the Tennessee River about 1934 or 1935, and I was a consultant for the complainants in the Ashwander case. I sat in the court room practically throughout the trial, but did not testify.

Some sections of the Mississippi River are comparatively wide. Navigation moves commercially and successfully between St. Louis and New Orleans, but is still in an experimental state between St. Louis and St. Paul. Lake Pepin is not continuously navigated by crafts ordinarily used on the upper Mississippi and the other inland waterways and [fol. 450] there have been occasions of difficulties on Lake Pepin. I have witnessed no hurricanes on the Tennessee River. It is not my opinion that it would require a hurricane to seriously interfere with commerce on the river. I so testified in the Santee-Cooper case, but the conditions are entirely different. In the Santee-Cooper case we had one small reservoir there of a few miles in length. Here we are going to have a lake, a set of lakes, less wide than involved in the Santee-Cooper case, but of considerably greater length, so that the difficulties are going to be somewhat more substantial. In that case we were dealing with fifteen miles of water on the Pinopolis Reservoir, with roughly about ten miles of width.

This difficulty of so-called wind and wave action depends upon the fetch. On the Tennessee River, the fetch will vary as between different lakes. The fetch is the unobstructed water distance over which wind may blow to create waves. That means the water is open and has no obstruction either to wind or waves in that stretch. And I might say that with reference to the reservoirs proposed, this fetch will vary from point to point, and be different as between pools. When I testified that it would require a hurricane to interfere with commerce in the Santee-Cooper case, I was dealing with a fifteen mile fetch over a comparatively short journey where vessels could stay tied up in port rather than venture out into the hurricane. I have calculated the fetch in the different reservoirs of the Tennessee plan. None of them exceed fifteen miles in length.

Within the past year I think I have studied the recent reports of the Army Engineers, dealing with navigation improvement on the Tennessee River, the Ohio, and the Kanawha. The time spent on the ground at each of the points on the Tennessee River would probably total about three weeks. The time spent in the office, studying the plans and the effect of them, all plans and the effect of them the equivalent of six months. I spent a total of three weeks on the ground, either in a boat or in auto trips to the various [fol. 451] places. I came all the way up the Tennessee in a small out-board motor boat, carrying four persons and about seventeen or eighteen feet long. I took eight days for that trip. I could not tell what the speed was. On that trip I inspected each of the dam sites and each of the dams in a general way. I did not make any detailed study as to the details of the construction, but merely as to the location of the locks, whether on the right or left bank, and the factors which I felt affected navigation. I did not go into the designs of the dams. There were eight days of this one particular boat trip. Then, on the three automobile trips I took, plus my time at Wilson years ago, I would state that the rough estimate was slightly over or under two weeks, and would cover all of the rest of the three weeks.

I first came down here for a few weeks in the summer of 1936. Then I went back and returned for the boat trip in September of 1936. Then I came down here and spent a considerable length of time between the first of October and the first of January. I was down here in connection with the study; and then last August, I was down here for less than a week, and then I came down about the 8th or 10th of November. I imagine I spent not over all told two hours at each of the dam sites, and on several different visits to each one, I guess two hours time at each one.

The testimony which I have given is based partly on the reports of the Army Engineers and partly on the reports of the TVA. I would call what I made as original a study as can be made under any circumstances. My material came from the published document of the War Department, but in turn that material came from the railroads. I would have had to go directly to the railroads myself for the same class of material. I spent some time in each of the river cities themselves to get generally familiar with their industrial setup. I certainly did go around sizing up the plants. I have been doing that for the last two or three weeks.

I have made no geological surveys. I am not a geologist. I [fol. 452] am used to relying on geologists' reports for those things.

I observed that there would be large locks on the dams below Wilson. I have no criticism of the locks from the standpoint of their feasibility for traffic below Wilson Dam. Those 600 by 110 foot locks are ample in size. The size of the lock at Wilson is 60 feet by 300 feet in the clear for full width. The difficulty is that when you get to Wilson, you would have to break tow at Dam No. 1. The lock at Hales Bar is a little shorter, about 280 feet as I recall it. The major difficulty is in breaking tow at Dam No. 1 and at Wilson. They would have to be broken again at Hales Bar. The operation would be you would lock through part of your equipment at Dam No. 1, possibly take it all of the way through to Wilson Lock and then return to get the balance of it. Then you would make up your tow again and go up to Wheeler, and whatever size lock is there would govern what you did.

“Q. You know, do you not, that the Army was building the lock at Wheeler when the Tennessee Valley Authority was first created and undertook this work?

A. That is correct.

Q. And you know also, do you not, that the Chief of Engineers and the Board of Rivers and Harbors recommended that the smaller locks be placed in the dams above Wilson for the time being?

A. I don't know whether they made that recommendation with reference to the dam of the Tennessee Valley Authority.

Q. Well, you do know that in 328 they made that recommendation, do you not?

A. They made that, the Board of Engineers made that recommendation.

The final recommendation of the Chief of Engineers for a sum total of \$74,000,000 some hundred thousand, which included the large locks all the way through.

[fol. 453] Q. Now, let me read you from House Document No. 328, the report of the Chief of Engineers. I will ask you this—

Q. On page 6, paragraph numbered 21, the Chief of Engineers says:

'While locks of the size used in the Ohio River would be a great advantage in passing a large tonnage water borne commerce through these high dams, the Board considers that the smaller locks on which the estimate of the District Engineer were based can carry a large and valuable amount of traffic and will be sufficient to handle all the commerce which can be expected to develop for many years after the construction of the dams. If, at some future date the development of a larger traffic makes the provision of additional parallel locks desirable, such locks can be added at that time and can be made of Ohio River size if economic conditions then justify such dimensions.'

Now, does that refresh your recollection as to the position of the Chief of Engineers?

A. It does not change it, because he is reciting what the Board of Engineers stated, whereas the Chief of Engineers' final recommendations are different.

Q. Does he dissent from that part?

A. Not in so many words, but he recommends the \$74,709,000 project, which, by reference to detail, incorporates the cost of the larger locks.

Q. Well, we will go back to that in a moment. Neither, at this point nor elsewhere in this report does he criticize that, does he, any particular?

A. No, not that I know of.

Q. Who was in fact the Chief of Engineers when the Army began the construction of Wheeler Lock?

A. I think General Brown was Chief of Engineers then. I am not sure.

Q. And he was the man who wrote this part of the report, was he not?

A. That is correct."

In my inspection of these dams, I could not tell whether or not the TVA had provided places in all of the new dams [fol. 453a] for the insertion of the additional and larger lock at a later date, but I understood that to be the case.

In dealing with the alternative plan for the low dams, I have assumed the scheme discussed in House Document 328. That provides a minimum depth of 9 feet. Those proposed low dams were comparable to the prevailing depths on the Ohio River and the Kanawha River. I am not sure as to whether the new work has been finished on

the Kanawha, but on the Ohio they have a project with a minimum depth of 9 feet.

I testified about the value of having the channel with a minimum 9-foot depth so there would be no friction of the vessels with the bottom of the river. If you have a nine foot draft and a nine foot depth, you would have collision. If there was an inch of available water between the draft and the depth, you would have friction. It is now customary and the practice of Army Engineers to provide the channel for 9-foot draft by providing some substantial overdepth. The additional depth depends upon the question of whether the excavations are in rock, clay or sand. Where the channel is in rock and the collisions would be serious, they provide extra depth there. I am aware that the Corps of Engineers has recently replaced some low lift dams on the upper Ohio and Kanawha rivers with higher dams. I think twenty-eight feet at Winfield on the Kanawha is the limit. They have also replaced a couple of low dams on the Kanawha. I only know very remotely about the dam of around 60 feet in height that is being constructed on the Warrior River. I have never seen it, and have just heard there was such a thing.

When I was a Major in the Corps of Engineers, I recommended an improvement on the Illinois River for a nine foot channel. I have forgotten the amount of over-depth beyond the nine foot channel, but I know it was substantial.

I am generally familiar with the recent recommendations of the Chief of Engineers for the replacement of the old low locks and dams on the Ohio River with a less number of higher lift dams. I concur in the following opinion of the Chief of Engineers in House Document 306, 74th Congress, 1930:

"The dams on the Ohio are generally of the Chanoine wicket type with submerged moving parts, and the locks constructed in the early part of the period of the work did not meet modern standards of concrete construction, and are subject to progressive deterioration over a long period of years.

"The general plan for the most effective improvement of the main stream of the river is the execution of betterment to the existing system, and the progressive replacement of the old locks and dams with a less number of higher

lift dams as the replacement becomes necessary because of the deterioration of the old dams, or warranted because of the superior facilities afforded to navigation."

The dams that were eliminated on the Ohio and the Kanawha were of the wicket or removable type. I believe there were some fixed dams at the upper end of the Ohio River that are being replaced by a roller gate type of dam.

In getting the information as to the cost of the low dam development of the Tennessee, I made three independent investigations, and with respect to one, which was practically the same in characteristics as that shown in House Document 328, my estimate came out about \$75,400,000, so to that extent I have made an independent estimate. In the course of making my own estimates, I actually passed the site of each of the proposed structures. I made no borings or geological investigations, for they are not necessary for that type of preliminary estimate, for that type of structure. It was a preliminary estimate of the construction of that type of dam. I made no estimates as to the amount or the cost of the various materials, such as cement, steel or of the types or of the quantity of labor, or of the rates of pay, the cost of construction camps, and that sort of thing. My estimates covered the number of lineal feet of dam for various degrees of lift, size of locks, and with experience elsewhere and knowing what dams of that character cost per lineal foot, I was able to arrive at this preliminary estimate. I did not just assume that I would know what that dam would cost per foot. I made a sufficient study of factors such as the cost of actual materials, steel, cement, property, materials to be purchased, labor, the type and quantity of labor, the rates of pay, etc., to be able to cut the thing short and make preliminary estimates of that character, without going into all of those details.

I made no complete investigation of the character of the sites. I made considerable previous study of the surveys available, showing soundings, showing the general character of the underlying material, the width of streams, contours of the bank, and other things which would affect the cost of structures at each location. The basic data for that information came from the unpublished exhibits of House Document 328. I did not get that from any other source. My understanding is that final borings at every site were not made prior to the writing of House Document 328. They

were dealing with a structure here that was comparatively light in construction, so that the factors of probable error [fol. 456] were very small. I made an estimate of the dredging necessary by comparing the stream with other streams in my experiences and knowing the cost of dredging elsewhere. I made no soundings in the field to determine the presence of shoals here and there. Observation showed their existence and the characteristics of the river are such that by comparison with other streams it is possible to arrive at a reasonable estimate. I made no assumptions as to the profile of the river or the cross sections, except I assumed the unpublished exhibits of House Document 328 were correct in showing that.

The figures I took as the cost of the high dam project of the TVA were the figures that were shown on Page 403 of Hearings before Congress with reference to appropriations in about April, 1937. The total figure reported in those Hearings was in excess of \$520,000,000., which was the ultimate stage, and from that I deducted the figure shown in that same table for the original cost of Wilson Dam, arriving at the approximate figure of \$473,650,000. for the works exclusive of Wilson Dam. That includes the estimated cost of all the dams, including flowage rights, locks, provisions for electric power and power house facilities, generating plants, the cost of Fontana Dam, the cost of the highways, the town of Norris and forest lands. I have arrived at no independent figure for the cost of the dams excluding Fontana and excluding the power house and generating equipment and excluding the other property in the vicinity of the dams.

I estimated the cost of maintenance and operation for the low dam project by setting up my opinion as to the size of crew that would be used to operate the locks, and the amount of money required to maintain the locks, to repair them, and the amount or the size of the crew, and the amount of money necessary to maintain and operate the wicket dams, and by comparison of the Tennessee with other streams, I estimated the amount of dredging to be required, and bringing these all together, the estimate I gave [fol. 457] of \$1,580,000. covers the total for the low dam plan. On the low dam program, I assigned to maintenance of locks \$160,000; operation of locks \$422,400; maintenance and operation of dams \$510,330; dredging \$489,000; total \$1,581,730.

For the TVA program I estimated maintenance of locks \$296,000; operation of locks \$92,400; maintenance and operation of dams \$280,330; dredging \$326,000; total \$994,730. I estimated that it would take only \$10,000 per year to operate a moveable dam. That is just the dams alone and does not apply to the reservoirs.

In reaching my conclusion as to the comparative length of time required to navigate the entire length of the river with the high dam scheme as compared to the low dam scheme, I assumed the movement of a tow boat and tow at a speed of 5 miles per hour in still water, and then I made appropriate deductions for lost time in connection with lockages, inadequate channel dimensions, such as depths too close to 9-feet and inadequate channel widths and other factors entering into the consideration, so I could not give you the exact figure an hour, but that is the method that was used. With respect to the comparative times required for lockage, I figured that with the low dam program, 7.3% of the time would be lost in navigating from one end to the other of the river as compared with 4% of the time with the TVA program. In other words, it would take almost twice as much time for lockages under the low dam plan.

I adopted the study of the traffic potentialities in House Document 328 only as far as utilizing the consolidated reports that have been obtained from the railways as to the actual traffic movement existing in the area at that time is concerned. From then on, I made my own study. I did not adopt the estimate of the District Engineer that by 1950 there would be 17,000,000 tons of traffic at an annual saving of \$22,000,000. I considered exactly the same line of commodities that were considered by the District Engineer [fol. 458] at that time. The difference lies possibly in a difference of opinion as to how much existing traffic would be diverted to water. I took the same classifications and had them classified and summarized in one table. They had some 27,000,000 tons of commerce that was classified into about 13 different classifications, and I used the same, and found some tonnage to move from each and every one of those classifications, but different amounts than the District Engineer had worked out. I have a total estimate in the neighborhood of 100,000 tons per year of petroleum products, to move over the waterway. I know that the traffic in petroleum products has grown markedly in the last few years on inland waterways. There is a substan-

tial saving in those shipments of petroleum products where the distance factor is satisfactory. I do not know of any substantial investments by oil companies in terminal sites on the Tennessee River. I know that inquiries have been made and some plans have been worked out. How substantial in the way of dollars and cents, I do not know. That is generally one way traffic going up-stream.

I made an estimate of the cost of terminals for handling the commerce I expected to materialize under either plan. I analyzed this traffic movement which I estimated would result on the assumption that suitable terminals would be provided at the river ports. Then I went to those port locations and further analyzed my traffic movements to see how much traffic would be received and shipped to each one of those locations. Then I made an estimate of the cost of terminal facilities to handle the predicted movements at these specific locations.

I have not totalled the cost of terminals under the two schemes. I have got it individually by ports. There would be about 14: At Johnsonville with the TVA plan \$122,100, with the low dam plan \$163,150; Florence, Sheffield and vicinity with the low dam plan \$210,835, with the TVA plan \$200,795; Decatur with the low dam plan \$255,926, with the [fol. 459] TVA plan \$232,660; Guntersville with the low dam plan \$357,755, with the TVA plan \$238,505; South Pittsburg for either plan \$25,230. At Chattanooga, I made no estimate, as I found no difference in the cost of terminal construction there. At Dayton, with the low dam plan, the terminal cost \$44,800, with the TVA plan \$22,400. At Knoxville, with the low dam plan \$952,211, with the TVA plan \$906,868. This summarizes in showing the differential cost between the two of \$281,249.

You will have greater fluctuations of pool levels with the low dam scheme except at the head of Hales Bar pool, which I do not think will be affected much one way or the other.

The alternate land haul in combination with the water borne traffic varies as between commodities and as between ports. For instance, out of Chattanooga there will be some commodities that might be diverted from rail that would come from points in Georgia, South Carolina and North Carolina. I could not give you the exact distances without reference to a lot of detail.

I did not make any assumptions as to the land movement combined with the waterway. I didn't handle it that way. I

got the traffic to the port by the shortest land route, and from there on made an estimate of the comparative costs of transporting to destination. I utilized largely rail transportation for the long distance haul to rail-water interchange. For local movements, there would be either local switching by rail or short distance trucking. In calculating the savings, part was assumed to move by truck.

I have rather detailed figures in regard to the direction in which the traffic moved up-stream or down-stream. I had what we call an unbalanced load factor of about 80%. The traffic in one direction would be 80% of the traffic in the other direction for the river as a whole based upon ton miles of movement. It is a high factor for loading. Within the limits of my ability on a matter of this kind, that is the way it came out and I had to stick with it.

[fol. 460] I calculated my item of savings on the basis of rail costs, as distinguished from rates. I used water costs as well. In my recommendations on the Illinois River, my estimates then were based on rail rates. I stated that I would estimate a savings of about 63.3¢ per ton. I am familiar with the Chief Engineer's estimate of \$1.31 per ton. I cannot tell off-hand what ratio of the total those two estimated savings represent. I didn't assume an average haul. What actually happened was that certain traffic movements were worked out, and then the average haul resulted from those traffic movements. As I recall it, it was in the neighborhood of an average haul of 200 miles, a relatively long stretch when considering waterway traffic throughout the country, particularly when you consider the present condition of the Tennessee River and the existing traffic. I have not seen recent figures on savings on the Ohio. I have just seen Colonel Hall's report, but I have not had a chance to go into it. I know that the haul is increased and the savings are beginning to increase on the Ohio.

Generally speaking, the longer the efficiently improved waterway and the greater the number of interconnections to industrial, productive and trading points, the greater will be the traffic naturally on the waterway system.

The petroleum products have self-propelling barges on the canal systems in the East, New York State Barge Canal, and so on; on the western rivers the barges largely have to be towed by tow boats.

I don't recall the size of the locks on the Monongahela River, but I think that they are small locks. The traffic

upon that river is about the heaviest in the country. As I recall it, there are twin locks on the lower Monongahela, about the same dimensions as the lock at Wheeler. I think where this heavy traffic is being handled, they are twin locks. In the upper portions, they have single locks. The product there that is shipped so heavily is coal. It comes from mines [fol. 461] practically on the banks of the river and is shipped down to steel mills at Pittsburgh on the banks of the river, not more than 100 miles from Pittsburgh.

In my study of navigation costs, I do not assume still water but figure on my losses at lockages, current velocities and so on, with reference to a tow that could make 5 miles per hour in still water. I had to have some basis for it.

The percentage of time that the wicket dams would be down would change from time to time, depending upon the character of the flow of the stream at that particular point. In the lower river, the percentage is up to 65% of the time. On the upper river, the per cent of time begins to decrease at Florence, and above Chattanooga it is anywhere from 8% to 25%, I believe.

I do not recall whether or not more traffic moved up-stream than down-stream. So far as petroleum is concerned, it would be entirely up-stream. I will have to refer to my notes. Out of a total traffic movement of 1,654,000,000 ton miles, 924,000,000 of that will be up-stream and 730,000,000 will be down-stream. (The witness thereupon produced a typewritten table from his working papers giving a list of the specific commodities and the amounts. This table was offered and received in evidence as Defendants' Exhibit 16).

It would require an immense amount of detail to give the velocities of the current in the navigable passes in the low dam plan. I can summarize and give the average current velocity in three sections of the river under the low dam plan, covering the entire year, whether the dams are up or down. Between Paducah and Dam No. 1, the average current velocity throughout the year will be 1.06 miles per hour; between Wheeler and Hales Bar, it will be 1.12 miles per hour; between Chattanooga and Knoxville, it will be 1.15 miles per hour. By Dam No. 1, I am referring to an existing low dam just below Florence which will fit into either plan. [fol. 462] It is $2\frac{1}{2}$ miles below Wilson Dam with a small canal connecting the two.

I also have figures which will show the duration of various current velocities at some sixty odd cross sections of the stream, but I cannot answer the specific question as to the average current at the time when the boats are going through the navigable passes without some further calculations. The current will be the equivalent of exceeding 3 miles per hour over the entire stretch of the river for 2.17% of the time. In other words, locations are spotted where the velocities in excess of 3 miles per hour will occur. 2.33% of the navigating time would be lost by reason of velocities in excess of 3 miles per hour. That is taking the entire river and taking and balancing the gains on down-stream traffic against losses on up-stream traffic, limiting the down-stream speed in straight stretches to about 8 miles per hour, which cuts off some of the round trip, and around the curves to as low as 3 miles per hour. I cannot assume that the current averages 4 miles per hour throughout the entire 650 mile stretch from Paducah to Knoxville. In spots it will get as high as 5 and $5\frac{1}{2}$, maybe 6 miles an hour, but throughout the entire length of the stream, its average velocity will be less. A current of 3 miles per hour would not be a substantial impediment to navigation if it occurred on a straight stretch of the river. If it occurred on very crooked stretches, it would be substantial to the extent it required slower speeds going down-stream than the current would permit you to take in a straight reach. If it is a straight reach, you lose the 3 miles going up, but gain it going down. I have not assumed that the gains going one way balance the losses going the other.

Assuming a 100 mile stretch, a vessel going 5 miles per hour and a 3 mile current, the vessel will go up-stream at the net rate of 2 miles per hour and will take 50 hours for the 100 miles. It will come down-stream at the rate of $5 + 3$ or 8 miles per hour, taking $12\frac{1}{2}$ hours for the 100 miles—that [fol. 463] is a total of $62\frac{1}{2}$ hours for the round trip. If you are navigating in still water, it takes you 20 hours to go up and 20 hours to come back or 40 hours for the round trip. The net loss by having that current is $22\frac{1}{2}$ hours.

The velocities will vary in different stretches of the river and depending upon the quantity of water moving in the different stretches, so the average for the entire river does not give you a great deal of information regarding particular velocities in particular stretches. They have to be analyzed in each particular stretch.

In my recommendations for the Illinois River, I recommended over-depths of the pools on a 100 mile stretch of that river. When I recommended the 3 ft. over-depth, that is 3 ft. in addition to the bare 9 foot depth on the Illinois, I made that recommendation based upon the report of the Army Engineers on experimental towboat operations. I did not make any estimate of the increase in savings to the shippers by reason of that over-depth. It is my opinion that in addition to the tangible benefits that may be calculated from simply the bare savings in the cost of certain transportation, there are certain intangible attributes to all projects of this character.

The following quotation from my article entitled "The Value of Water Transportation" from the proceedings of the American Society of Civil Engineers, September, 1937, accords with my opinion:

"All the great nations of the world have been developed on the premise that the sea is the base of the system of transportation. The world ports achieved their preeminence because they served as focal points for the lines of transportation to the interior, and as gateways for commerce over the free routes of the high seas to domestic as well as foreign destinations. The controlling elements in this situation are (1) That ocean transport was, and still is, cheaper than land carriage; and (2)—which is possibly of greater importance—that the water highways are free and dedicated to the unrestricted use of all.

[fol. 464] "By close analogy the interior of a great country may be developed to best advantage by preserving for the use of the general public the free water highways of its great rivers even at some expense, if necessary. The principle involved is identical. In the writer's opinion the price of about \$22,000,000 per year is a small one for this country to pay if, in making this investment, it accomplishes the multiple purpose of salvaging large expenditures made in previous years, of preventing a violent readjustment in the distribution of industries and population, and of preserving a group of minor 'sea bases' located on a secondary coast line 7000 miles in length.

"There is another important set of intangible values involved in this question which can be emphasized to best advantage by quoting a short part of a statement by the

late G. E. Grunsky, Past President, American Society of Civil Engineers:

“ ‘In his opening paragraph the Author, the late William Murray Black, presents the conclusion that a new waterway line of transportation should not be established unless the need for it can be shown, and unless *if it* established, it will produce an annual saving in the cost of transportation greater than the interest on construction plus maintenance and operating costs’. There is another element which should sometimes be considered when the advisability of such a line of transportation is being studied, and by virtue of which many a project may be found advisable, despite the fact that it cannot, perhaps, for many years in the future, produce revenue to meet in full the interest charges against it. This element is the project’s contribution to general prosperity as measured in terms of population, of business, and of property values. It becomes a factor because the expenditure of funds in its construction and the utilization of the facilities which it provides when it is completed, bring increase of population; and to the extent that the growth in population of the zone coming under the influence of the improvement is thus accelerated, to the same extent will land values increase, and wealth be created, which may fairly be weighed against the cost of the improvement when the advisability thereof is under consideration. Society, in other words, may reap material advantage from many an enterprise that would be condemned by the stockholder who weighs only the cost of the service against the prospective revenue.’ ”

[fol. 465] “Q. Major, assuming that Gilbertsville Dam will create and maintain a depth of more than 9 feet for a distance of 184 miles along the Tennessee River from the mouth of the river to Pickwick Landing Dam, in your opinion, will this be a substantial improvement in the navigability of the river?

Mr. R. T. Jackson: Over present conditions?

Judge Allen: He may answer.

Mr. Fly: Oh, yes, of course.

A. It will be an improvement over the condition of the river as it now is.

Q. It will be a substantial improvement, will it, Major?

A. It will be a substantial improvement so far as width, and depth are concerned, yes,—width and depth of channel.

Q. I am asking, I want to make this clear, will it be a substantial improvement in the navigability of the river?

A. It will.

Q. Assuming that Pickwick Landing Dam will create and maintain a minimum depth of more than 9 feet for a distance of 53 miles along the Tennessee River from the site of the dam to lock and dam No. 1, in your opinion will this be a substantial improvement in the navigability of the river?

A. It will.

Q. Assuming that Wheeler Dam will create and maintain a minimum depth of more than 9 feet from the site of Wheeler Dam to Guntersville Dam, in your opinion will this be a substantial improvement in the navigability of the river?

A. It will.

Q. Assuming that Guntersville Dam will create and maintain a minimum depth of more than 9 feet from the site of the dam to Hales Bar, in your opinion will this be a substantial improvement in the navigability of the river?

A. It will.

Q. Assuming that Chickamauga Dam will create and maintain a minimum depth of more than 9 feet for a distance of 58 miles from the site of the dam to the proposed site of Watts Bar Dam, in your opinion will this be a substantial improvement in the navigability of the river?

A. It will.

[fol. 465a] Q. Assuming that the proposed Watts Bar Dam when constructed, will create and maintain a minimum depth of more than 9 feet from the site of the dam to the site of the proposed Coulter Shoals Dam, in your opinion will this be a substantial improvement in the navigability of the river?

A. It will.

Q. Assuming that the proposed Coulter Shoals Dam when constructed, will create and maintain a depth of more than 9 feet from the site of the dam to a point above Knoxville to the formation of the river, in your opinion will this be a substantial improvement to the navigability of the river?

A. It will.

Q. Assuming that all of the dams of the Authority's project will create and will maintain a navigable channel of

more than 9 feet in depth from Paducah, 652 miles to the point of formation of the river, in your opinion will this project be a substantial improvement in the navigability of the Tennessee River as a whole?

A. It will."

Redirect examination:

Under present conditions there is a 9 foot navigable depth in the Tennessee River from the mouth at Paducah, Kentucky, of only 15 miles. The rest of it does not have a 9 foot navigable channel. In my opinion, the provision of a 9 foot continuous channel from Paducah to Knoxville would be an improvement of the navigability of the Tennessee River. The navigable channel should be attained by the expenditure of such funds as would be necessary and only such funds as would be necessary to provide an efficient navigable channel of that depth. In my opinion, the expenditure of six times as much money as would be required to provide a navigable channel of this character could not be justified as an improvement in navigation.

In my computation of comparative theoretical efficiencies of the low dam navigation plan and of the channel resulting from the TVA plan, I took into consideration all such [fol. 465b] factors as widths, depths, current velocities, curvatures and things of that kind.

I was asked on cross-examination about the possibility of any adverse effect upon navigation on the TVA lakes because of the excessive widths for inland water transportation using the standard customary equipment for that purpose and an incident has come to my attention with reference to the effect of waves on Wheeler reservoir. The Waterways Journal of St. Louis, Missouri, is a trade paper in the water transportation business and is generally recognized and accepted as a reliable publication. (An article from such Journal was thereupon marked for identification Complainants' Exhibit 347 and the following occurred:)

[fol. 466] "Q. I show you what has been marked as exhibit 347 and ask you whether that refers to the incident of which you just spoke?

A. It does.

Mr. Fly: I object to this as the rankest sort of hearsay, your Honor.

Mr. R. T. Jackson: I think not. I think it has been qualified by the cross examination.

Mr. Fly: You have not qualified that as a news item.

Mr. R. T. Jackson: It is a trade paper.

Mr. Fly: You have not qualified that, look up the rules as to qualifying trade papers and statistics, it will take an hour to do it.

Mr. R. T. Jackson: I think not.

Judge Allen: The exhibit is rejected. You may have your exception.

Mr. R. T. Jackson: We have our exception noted on the record that 347 has been rejected. Now, I do not want to violate the ruling of the Court. I was going to ask the witness whether or not he could state more definitely the nature of the incident to which he referred.

Mr. Fly: That is taking the same hearsay right into this record.

Mr. R. T. Jackson: It is information that has come to him as a man who is an expert on inland waterways.

Mr. Fly: Through a newspaper.

Judge Allen: Just a minute. You may have your exception.

Mr. R. T. Jackson: May I make the offer to prove very brief.

Judge Allen: Very brief.

Mr. R. T. Jackson: Complainants offer to prove that it has come to his information as a student of inland water transportation that on or about September 18th, or shortly prior thereto, 1937, a pusher boat of the Tennessee Valley Authority lost its tow in a Tennessee Valley windstorm—that was in April, 1937,—upon Wheeler Lake with the result that there was some damage, and that that one tow boat was delayed for 44 hours and another for 22.

Judge Allen: The Court adheres to its ruling.

Mr. R. T. Jackson: Exception noted, please."

[fol. 467] I was asked on cross examination about making a computation of savings in my report on the investigation of the Illinois River, based upon comparative rates, and about my present estimate, based on comparative costs. Shortly after I became engaged in the navigation business, I found that as an operator I had to meet the costs of my

competitors rather than their rates. And as a matter of general procedure then in evaluating savings, it was necessary in my opinion to compare costs of water transportation with costs of rail or water transport company rates as against railroad rates—and not compare rates in one case against costs in the other, or vice versa. From the standpoint of public benefit, the question of gain, if any, is reflected by the difference in actual cost as that reflects the expenditure of the natural resources.

The usual practice of navigating the Mississippi, if the waters are so wide as to create hazards, is to hug the shore or else have tows tie up. In many places during flood stages, the navigator has the protection of trees growing along the natural lower water banks of the river, and the result is that the probability of encountering dangers or delaying conditions is much less than in an open lake. The same situation obtains with reference to tree shelters or tree belts along the banks and with reference to natural banks along wide places on the Mississippi and on the lakes that are created and to be created by the TVA. There is along considerable stretches of the Tennessee River in its natural condition just the same belt of tree protection and natural bank conditions. There are tree banks which, under natural conditions of wide water floods, shelter the navigator. That condition will not continue to obtain after the lakes are built by TVA.

If small locks, such as are to be installed in the TVA dams above Wilson Dam were used in the low dam program, there would be a substantial reduction in the estimates of cost below the \$74,709,000 figure. I stated that the highest of the so-called high dams on the Ohio River and [fol. 468] the Kanawha River was 28 feet. Those so-called high dams on the Ohio River and the Kanawha River will not create lakes comparable with the lakes which have been created and will be created by the execution of the TVA plan on the Tennessee River, because their height keeps the river within its natural banks at practically all places. Those dams on the Ohio and Kanawha Rivers, which are being built in some instances by the Army Engineers, do not give rise to the hazards to inland shipping caused by wide waters about which I have testified.

Assuming the completion of all of the dams in the TVA plan on the main river, or any other dams for that matter,

to create slack water navigation on the main river, the three headwater storage dams, to wit: Norris, Fowlers Bend and Fontana, on tributaries, would not be necessary in any way and would not in any way contribute to maintaining the slack water navigable depths of the Tennessee.

Recross-examination :

It is my understanding that the Army Engineers planned a dam of the general type of Norris at that site.

During the past year, I do not know of any disasters to navigation on the Wilson Dam pool due to wind and wave action. I know of no disaster to navigation during the 11 years that that lake has been there.

Examination by the Court :

From my studies of the river borne transportation on the Tennessee River, the saving on existing river transportation over rail transportation I estimate at about \$2,000,000 a year. On existing traffic, the ratio is large, because of the nature of it, and there is saved an annual amount of about \$2,000,000 out of a total transportation cost of about \$3,000,000. On the future traffic, the situation is different. I can get that for you, but I cannot do it on the stand right [fol. 469] now. (In compliance with the Court's request, the witness produced a memorandum of his estimates of the cost of Tennessee traffic by land and water, which was marked Complainants' Exhibit 363 and was offered and received in evidence.) It is correct to state that the circuitry factor involves the fact that commodities are transported, not as the crow flies, but that they have to go the longer way round. The circuitry factor exists for all practical purposes, either under the low dam or the high dam plan, because of the inherent nature of the river. The river is confined by mountains in a great many places and has to wind, so that the circuitry factor as between the two plans is practically identical. I estimated the difference in efficiency between the low dam system and the TVA system in terms of percentage of time. I estimated that the TVA plan on the theoretical basis was 43¼% better as to navigability than the other. If it took a hundred hours to navigate the Tennessee River by way of the low dam plan, it would take 95¼ hours to navigate it by way of the TVA plan.

"Judge Allen: Well, then, so far as the depth of the channel is concerned, so far as securing the channel is concerned, the two systems secure the same channel?"

The Witness: They secure the same channel. There are greater depths and widths in the Tennessee Valley Authority channel than the other, but they both secure the minimum of nine feet.

Judge Allen: But substantially the same channel.

The Witness: Then the Tennessee Valley Authority channel is substantially wider and deeper at the lower end?

Judge Gore: You may have stated, but if so I overlooked it,—What is the dimension of the locks at Dam No. 1?

The Witness: The lock at Dam No. 1 is 60 feet wide, and has a useful length of 300 feet.

Judge Gore: The same as Wheeler?

[fol. 469a] The Witness: Wheeler has 360 feet of length.

Judge Gore: I mean Wilson.

The Witness: Wilson is the same, 60 by 300. Hales Bar is 60 feet by two hundred eighty some odd feet. They are about the same size, those three sets of locks."

Redirect examination:

I measured these against the hypothetically perfect water way and I got a theoretical percentage of efficiency, difference in the two of 3.2%. That took into consideration all considerations as to width and depth. The computations of savings by water transportation are independent of which plan is used.

(The witness was excused.)

[fol. 470] FORD KURTZ was called as a witness on behalf of the complainants and, having first been duly sworn, was examined and testified as follows:

Direct examination:

I reside at Hollis, Long Island, and am at present Hydraulic Engineer of the J. G. White Engineering Corporation of New York City. I received my preparatory education in the public schools and in the State Normal School of East Stroudsburg, Pennsylvania. I received my technical education at Cornell University, where I was gradu-

ated in 1907 with the degree of Civil Engineer, with first honors. I have been a member of the American Society of Civil Engineers since 1919, and have served for three years as the secretary of the Power Division of that Society. I am also a member of the honorary scientific society of Sigma Xi. I am a licensed professional engineer in the states of New York and Pennsylvania.

From 1907 to 1910, I was an officer of the United States Coast and Geodetic Survey engaged in geodetic survey work in various sections of the United States. Since 1910, I have been connected with J. G. White & Company and with the J. G. White Engineering Corporation in various capacities. During this period, my principal engagements have been:

First, from 1910 to 1912, Assistant to the Hydraulic Engineer of the J. G. White & Company, during which time the major portion of my work was in connection with all of the various phases, hydraulic features and phases of hydro-electric projects, including water supply, available power, the general layout of the hydraulic features of the projects and a study of the maximum flood to be expected and the provisions which could be made for passing it over or through the dam.

[fol. 471] Second, from 1912 to 1913, Designing Engineer on the power house and on other hydraulic features of the Parr Shoals Hydro-Electric Development on Broad River in the State of South Carolina, and on the Stevens Creek Hydro-Electric Development power house and dam located on the Savannah River located near Augusta, Georgia.

Third, 1913 to 1914, Resident Engineer on the construction of the Parr Shoals Development.

Fourth, 1914 to 1915, a second engagement of about one year on hydro-electric development studies, including writing of reports thereon.

Fifth, 1915 to 1917, Designing Engineer and later Resident Engineer on the construction of a complete gravity water works system for the cities of Caibarien and Remedios in the province of Santa Clara, Cuba.

Sixth, 1917 to 1918, Designing Engineer on air field drainage, storm sewers, sanitary sewers and sewerage disposal plant and a water works system for Langley Aviation Field near Hampton, Virginia.

Seventh, 1918 to 1919, Resident Engineer on the construction of the 60,000 kilowatt steam electric power plant of

the United States Nitrate Plant No. 2 at Muscle Shoals, Alabama, in full charge of all field engineering work and of all inspections in the civil, mechanical and electrical engineering fields.

Eighth, 1920 to 1922, a third engagement of about 2 years on field and office investigations and on the making of reports on hydro-electric plant projects and steam electric power plant projects.

Ninth, 1922 to 1928, in immediate charge of hydraulic design for the J. G. White Engineering Corporation.

Tenth, 1928 to date, hydraulic Engineer of the J. G. White Engineering Corporation in full charge of all hydraulic engineering work.

I have been intimately connected with the engineering [fol. 472] construction of the following large hydraulic projects, among others: Parr Shoals, South Carolina, a \$3,000,000. project with a concrete dam, 2000 ft. long and 35 ft. high and with a power installation of 18,000 HP; Stevens Creek, Georgia, a project costing \$2,250,000, with a concrete dam 2000 ft. long and 27 ft. high and with a power installation of 15,625 HP; Davis Bridge, Vermont, a project with an earth dam 200 ft. high and a power installation of 60,000 HP; Sturgeon Pool, New York, a project with a concrete dam 110 ft. high and a power installation of 20,000 HP; Oak Grove, Oregon, a project costing \$8,000,000. with a head of over 900 ft. and a power installation of 40,000 HP; Great Falls, Tennessee, a project which involved the raising of a 35 ft. concrete dam with large spillway gates to a height of 70 ft. and the installation of a new 22,200 HP unit; Blue Ridge, Georgia, a project involving an earth dam 165 ft. high and a power installation of 30,000 HP; Saluda, or Lake Murray, South Carolina, a project costing \$20,000,000 with an earth dam over 200 ft. high and more than a mile long and containing 11,000,000 cubic yards of earth and having a power installation of 220,000 HP; Pleasant Hill, Ohio, a flood control dam costing \$1,250,000.

Since 1910, I have made a very large number of investigations and reports on hydro-electric and other hydraulic projects, both prior to and during their final design and construction. These have covered a wide variety of such projects, in all of their phases, from water supply, provision for floods, amount of power and general design down to estimates of construction costs and of operating expenses. For example: I recently completed an extensive investiga-

tion and report on the \$220,000,000 aqueduct now being constructed to convey 1,000,000,000 gallons of water daily from the Colorado River across the deserts of Southern California to the city of Los Angeles. In this report, I passed upon the adequacy of estimates of construction costs, estimated in [fol. 473] detail the operating expenses of the project, inspected the construction work, completed and in progress, passed upon all of the major features of engineering design and upon the quality of water supply for domestic, industrial and irrigation purposes.

In the work which I have outlined, I have had occasion to study the matter of great floods and their control by reservoirs, as well as the designing of structures for safety against such floods. A complete study of any hydro-electric project involves an investigation of the floods on the stream on which it is to be located, and the study from which must follow a determination of the maximum flood to be expected, and the method of passing it safely over or through the dam. Also, in many of these projects the reservoir is large enough so that the retention of flood waters for equalization of the flow is an important factor in the study. In nearly every case also, outlets, either permanent or temporary, are involved for the control of floods and form an important part of such investigations and studies. In connection with the Saluda or Lake Murray dam in South Carolina, the type of dam and the construction program were such that extended studies were necessary in connection with the control of floods during the construction of the dam. The determination of the capacity of those outlets and the design of them, for taking care of the maximum flood to be expected during the construction, formed a very important part of the engineering work which I did on that project.

During 1935, I acted as Consulting Engineer to the United States Engineer Corps on the Pleasant Hill, Ohio, flood control dam and the Muskingum Watershed Conservancy District. At about the same time, I also acted as Consultant to the Engineer Corps on the outlet tunnels of the Fort Peck, Montana, flood control and water storage project.

I also in the last few years was in full charge of two extensive investigations and reports on the storage of flood [fol. 474] waters of the Blue Nile in Lake Tsana, Ethiopia, and the storage of those waters for irrigation uses in Anglo-Sudan and in Egypt. This work was done for the Egyptian,

Sudanese and Ethiopian Governments jointly. It covered two major surveying, mapping, hydrologic, as well as exploring expeditions, each taking more than one year and requiring also the sending of an expeditionary force to the country, including estimates of designs and estimates of costs of the project, and requiring extensive conferences, both in this country and abroad with both Egyptian, Sudanese and British officials.

During my engagement of nearly two years as Resident Engineer on the U. S. Nitrate No. 2 steam plant, which has as its source of condensation water from the Tennessee River near Florence, Alabama, I had extensive and ample opportunity to observe foundation conditions, as well as flow conditions of the Tennessee River from that vicinity as far as the head of big Muscle Shoals, which is a short distance from the present Wheeler Dam. Due to the deep foundations required for portions of the steam plant building and to the special and unusual rock conditions obtaining at that site, I had opportunity seldom given to study the characteristics of the lesser known of one of the important limestone formations which predominate throughout the Tennessee Valley.

In the design of Great Falls Hydro-Electric project on Caney Fork River in the Cumberland Plateau area of Tennessee, I had opportunity to study conditions of limestone formations of the same general character, as well as to study the matter of flood flows and their control through the gates which I have already testified were placed on that dam. Again, through the design of the outlets and structures of the dam of the Blue Ridge hydro-electric development on the headwaters of the Ocoee, which is one tributary of the Tennessee, I had ample and extended opportunity to observe foundation conditions, construction conditions in mountainous sections of East Tennessee where the rock formations [fol. 475] are quite different from conditions in the immediate valley.

During the summer of 1934, I visited Norris and Wheeler Dams of TVA, at times when a large amount of foundation was exposed and construction work in progress. I recently made an extended trip through eastern Tennessee and along the Tennessee River from Paducah to Knoxville for the express purpose of investigating conditions at the proposed dam and reservoir sites on the Tennessee River and tributaries and observing the areas subject to overflow by floods

in various towns and cities, among which were: Chattanooga, Knoxville, Kingsport, Florence, Harriman, Erwin, Newport, Mascot, Loudon, Dayton, Clinton, Murphy, Soddy, Oakdale, Stevenson, Charleston, Johnsonville, Embreeville, Rhea Springs, Riverton, Hamburg, Strawberry Plains, Fackler, Deermont, Perryville and Catlettsburg.

I have examined the report of the TVA to Congress made March 31, 1936 (Complainants' Exhibit 328) sufficiently to acquaint myself with the projects and structures involved in the plan of the TVA therein set out. I have also reviewed the annual reports of the TVA for the fiscal years ending June 30, 1935 to June 30, 1936, and also the printed reports of Hearings before the Subcommittee of the Appropriations Committee of the House of Representatives on the Second Deficiency Appropriations Bill for 1937, the First Deficiency Appropriations Bill for 1936 and the Second Deficiency Appropriations Bill for 1935. I have also reviewed House Document 185, 70th Congress, First Session; House Document 328, 71st Congress, Second Session; House Document 258, 74th Congress, First Session; all of which relate in whole or in part to the control of floods on the Tennessee River and its tributaries.

I have made a study of flood damages on the Tennessee River and its tributaries. All flood damages fall into two general classifications and I have used those classifications in my study. The first is hazard to life and the second is various types of damage to property. I had the subclassifications of damage to cities and towns as one group; to railways as another group; to highways as the third group; and to agricultural lands and crops as the fourth group.

Cities and towns represent large concentrations of improved real estate, such as houses, business buildings, industrial buildings, railway shops, improved streets, water supplies and all of those improvements around which communities center. All of these are subject, of course, to flood damage. Damage to railways consists in washouts of tracks and damage to or destruction of bridges. Damages to highways are of the same kinds as I have just stated for railways. The principal agricultural damage is loss of crops due to floods occurring during crop seasons. Occasionally, agricultural lands themselves are badly eroded by flood or damaged by deposits of material which destroy the fertility of the soil. But this is a type of damage which is of very

small import in the Tennessee River basin and should not and does not enter into consideration to any material extent in studying the problem of flood damages.

Flooding during non-crop seasons is as a general rule beneficial, because fertile river valleys have been built up in that manner and are re-fertilized in the same manner more or less every year as the floods occur. In general, it may be said that great floods on the Tennessee River occur out of the cropping season. That is, they occur in general in the months of December to April, inclusive.

(Counsel for complainants then stated that it was complainants' position that the power of the Federal Government in relation to flood control is limited to the protection of navigation or navigation works and channels and does not extend to the protection of local property, which is a function of the States, but that complainants were presenting evidence dealing with property damage as well as navigation.)

[fol. 477] The tabulation, (offered and received in evidence as Complainants' Exhibit 348), is based upon the data contained in the tables 2 to 57, inclusive, of Appendix N of House Document 328. I think the proper term is that those tables were published but not printed. The exhibit shows the population in 1930 of the cities and towns on the Tennessee River, which according to those tables which I have just mentioned as the source of the data, suffered damages during floods. It shows that the greater portion of population which may be threatened by flood damage by far, of course, is on the main river in so far as hazards to life is concerned. The purpose of this exhibit is to give some indication or index by which to judge the hazard to life during the very great flood that might be expected on the Tennessee River or its tributaries.

Referring to Complainants' Exhibit 348, the City of Chattanooga had the largest population of any city in the list in 1930—that was, 119,798, which represented more than 35% of the total population residing in towns and cities subject to flood on the Tennessee River and its tributaries. The next largest city among those subject to flood on the Tennessee is Knoxville, with a population of 105,802, which is more than 30% of the total shown on the list. The next five cities in order of size that are among those subject to flood damage are Asheville, N. C., Kingsport, Tennessee, Florence, Alabama, Columbia, Tennessee and Harriman, Tennessee. Less

than 8% of the population residing in towns and cities subject to flood damage reside below Chattanooga.

The table (offered and received in evidence as Complainants' Exhibit 349) shows the flood damages to cities and towns, railways and highways, in the entire Tennessee River basin caused by a large flood, and also the average annual damage caused by all floods. The information shown on this table was obtained from Tables 2-57, inclusive, of Appendix N of House Document 328. For the main Tennessee River and for the Clinch River, the magnitude of the large flood adopted by the U. S. Engineer Corps in [fol. 478] House Document 328 was practically the same at all points as the maximum flood of record during the past. For the Hiwassee, Nolichucky and Big Pigeon Rivers, the magnitude of the large flood adopted by the Engineer Corps was considerably greater than the largest flood of record. By far the greater portion of the damage to cities and towns is in the section of the main river above Chattanooga, the ratio for a great flood being \$3,217,600 to \$84,000. Most of the flood damage to cities and towns on the main Tennessee River occurs in the City of Chattanooga, where a very large flood, such as that which the U. S. Engineer Corps called a 500-year flood, is estimated to cause damage of over \$3,000,000 and would flood about 6,450 acres of business, industrial and residential areas and has, therefore, been a matter of great concern to the civic organizations and to the political organizations in that territory. It has been the subject of a great many investigations, reports, surveys since 1917, and as a result of that the State Legislature some years ago passed an act providing for the creation of a Flood Protection District which was organized and a great deal of work done by this organization on this subject.

The tributary of the Tennessee River which suffers the greatest damage to cities and towns is the Emory River, where a very great flood occurred in March, 1929, and where annual floods are very severe. In the case of this particular tributary, it represents more than 75% of the total damage to cities and towns on tributaries, both in a very great flood, and in the average annual resultant damages. The cities and towns on the Emory River which are particularly affected are Harriman, Oakdale, Deermont, Goby.

The major portion of the damages to railways on the Tennessee River and tributaries occurs on the Emory River in

the vicinity of Harriman and Oakdale, and on the French Broad River.

The percentage of flood damage to highways on the Tennessee River and its tributaries occurring below Chattanooga is about 43% of the damage during a great flood such as that set up by the U. S. Engineer Corps, and about 32% [fol. 479] of the average annual damage. For cities and towns in a great flood, the percentage of damage below Chattanooga is very small, perhaps not more than 2% or 3%. The percentage of total flood damage to railways on the Tennessee River and its tributaries occurring below Chattanooga is relatively small, not more than about 3%.

In referring to flood damage below Chattanooga, I have not included the City of Chattanooga. In referring to flood damage occurring in the stretch of river between Chattanooga and Knoxville, I included both Chattanooga and Knoxville.

The annual flood damages to cities and towns upon the Tennessee River at and above Chattanooga is more than 95% of the total annual flood damages to cities and towns in the entire basin.

In a great flood, about 30% of the total flood damage to highways on the Tennessee River and its tributaries occurs below Chattanooga, and of the average annual damage to highways about 43% occurs below Chattanooga. About 7% of the total flood damage of all kinds to cities and towns, railways and highways, combined, occurs below Chattanooga; that is excluding Chattanooga.

As the result of the study of flood damages which I have made, the data for which was briefly summarized in Complainants' Exhibit 349, I reached the determination that a flood control program to achieve the maximum practical protection of the Tennessee River basin, should be directed primarily at and above Chattanooga. I have made a study and determination of the maximum floods to be expected on the Tennessee River and its tributaries at and above Chattanooga. In the determination of the storm which could be expected to produce the greatest flood at and above Chattanooga, I used the records of the U. S. Weather Bureau and the publication of the Miami Conservancy District, entitled "Storm Rainfall of the Eastern United States". In the determination of the peak flows and maximum stages of the river which would be caused by that great storm, I used the records of the weather supplied by data of the U. S.

[fol. 480] Geological Survey, the data of House Document 328 and some general sources which are open to use by all hydraulic engineers.

The first step in the study of the storm which would produce the maximum flood to be expected on the Tennessee River and its tributaries at and above Chattanooga was, of course, the determination of that maximum storm through use of the data which I have just mentioned. Since I had already decided that this program to achieve maximum practical protection should be directed primarily towards securing protection at and above Chattanooga, I confined my study of those great storms to an area equal to that of the Tennessee River at and above Chattanooga, which is about 21,400 square miles. A study of more than 200 such storms covering at least that great an area revealed that in only 7 cases had that storm rainfall over an area of 21,400 square miles exceeded 12 inches during the entire period of the storm. Of these 7, 3 were summer storms on the Gulf Coast of Texas; 2 of them were summer storms on the Gulf Coast extending from Louisiana to Northern Florida; 1 was a spring storm on the coast of Alabama, and the 7th was a storm which occurred in November and centered on the Mississippi River between the States of Mississippi and Arkansas and extended into Western and Central Tennessee. This particular storm had a total rainfall of 11.85 inches.

At this point in my study I found it necessary to take up the subject of the percentage of the rainfall which during such great storms may be expected to run off into the streams. That percentage, of course, varies with the time of year and also with the condition of the ground at the time that the rainfall occurs. From a study of various data, particularly the excellent data collected in connection with the March, 1929, flood in central Tennessee, I found that during the period from December to April when these great storms in general occur that cause devastating floods, that the per-[fol. 481] centage of run-off is very apt to be as high as 90%. During other times of the year, that is, during the summer and during the late spring when some of the great storms to which I have just referred occurred, the percentage of run-off is very much less, so much less that you have to have a much greater storm during those particular months to produce a flood of a given magnitude than you have to have during the months from December to April. As a result of that digression from the main subject, I confined my study

after that particularly to storms occurring during this period when the run-off may be expected to be as great as 90%. The one particular storm out of the seven that was directly applicable to this case was the one that I mentioned that occurred in November and centered on the Mississippi River but extended into Western and Central Tennessee and affected the main river and its tributaries below Chattanooga. The other storms to which I have referred on the Gulf Coast had centers of very high intensity which do not persist in storms of that type when they pass inland over the area.

The conclusion which I reached is that the storm which would produce the maximum flood at, or to be expected in, the Tennessee River and its tributaries at and above Chattanooga would be a storm having a total rainfall of 11 inches. There are other characteristics for this storm in addition to the total rainfall and the percentage of run-off into the stream. The total rainfall does not give sufficient information to proceed to a determination of the maximum flood. It is necessary to fix the duration of the storm, the distribution of the storm during its duration, and also the distribution of the storm over the area in which it occurs.

The significance of those figures from the standpoint of flood control protection is that the shorter the period of time in which a given storm occurs of a total given rainfall, the greater is the peak flow which it will produce and, therefore, the greater the requirement on a system of flood control. The greater the intensity is over small portions of that area, the greater may be the local problem of protection.

[fol. 482] After a study of the duration period of the great storms to which I have referred, I decided that the storm which can produce this great flood through a rainfall of 11 inches during the entire storm would have a duration of three days; next, that the distribution of rainfall during the three day period would be 3 inches the first day, 6 inches the second day, and 2 inches the third day. I further determined that a storm of 11 inches was one of such great intensity that it would be sufficient to consider it as a uniform distribution over the entire area of 21,400 square miles, with two exceptions. One exception is the Emory River and the other is in the case of the upper reaches of the French Broad River. In the case of the Emory River, the potential damages are so great and the possibility of the occurrence of a

more intense rainfall over the 800 square miles of the river above Harriman are so great that I determined to base that part of the design upon a total rainfall of 13 inches. The same general remark would apply to the upper reaches of the French Broad River.

The chart, (offered and received in evidence as Complainants' Exhibit 350), shows the variation in flow, day by day, during the maximum flood to be expected at Knoxville, Loudon, and Chattanooga, showing in addition the maximum stage which would be reached at each of these three cities by that great flood and also the greatest stage that has been experienced at these three cities in the past. That is the maximum recorded stage as shown in the chart.

The chart (offered and received in evidence as Complainants' Exhibit 351) is a profile of the Tennessee River from Knoxville to Chattanooga showing: (a) the bottom of the river; (b) the low water line; (c) a line joining the peak stages, which I estimated to be reached at various points by the maximum flood to be expected at and above Chattanooga; and (d) a line similarly joining the highest stages which have been reached in the past at various points along [fol. 483] the river by the highest flood of record at each particular place. There are also shown the more important cities and towns which are affected by floods in this section of this river, and the horizontal line at the bottom of each of the vertical lines indicating the location of these cities indicates the elevation at which flood damage begins. The stage which this maximum flood would be expected to reach at Chattanooga would be 73 ft. at the Walnut Street gauge. The highest stage that the river has been known to attain at Chattanooga in the past is 57.9 ft. during the great flood of 1867.

Referring to the City of Harriman, the maximum flood stage to be expected at Harriman is higher than the severe flood of 1929 at Harriman which I mentioned awhile ago, but the difference is not as great as the difference shown on one of these exhibits to exist between the maximum recorded stage at Chattanooga and my predicted stage of 73 ft. at Chattanooga.

I have made a study for a system of flood control to achieve maximum practical protection against flood damage on the Tennessee River and its tributaries. The map (offered and received in evidence as Complainants' Exhibit 352) shows the entire Tennessee River Basin, the location

of the system which I have designed for flood control reservoirs, which have the maximum practicable protection, and the existing power reservoirs in the basin in May, 1933. The existing power reservoirs in May, 1933, are shown in blue and my recommended flood control reservoirs in red. The protection refers solely to the Tennessee River Basin and does not refer to the Mississippi Basin.

The table, (offered and received in evidence as Complainants' Exhibit 353), shows for each reservoir of the flood control system shown on the preceding Exhibit 352: (a) the name; (b) the stream on which it is located; (c) the tributary drainage area; (d) the gross storage volume; (e) the net storage volume; (f) the estimated cost of construction of the dam and reservoir; and (g) the lands flooded when [fol. 484] the water is at the spillway level in that reservoir. The reason for the difference between the columns headed "gross storage volume" and "net storage volume" is that a portion of the storage volume of any flood control reservoir is already in use by nature before the creation of that reservoir, for the purpose of reducing flood heights by what is known as valley storage. In creating that reservoir, the amount that has been previously affected through what I term valley storage is eliminated in so far as the additional effect of the creation of this reservoir is concerned in making computations of the reduction of such reservoir from the gross storage to arrive at the net storage which is used. The net storage is the amount that the system raises it over the system of nature.

The system of flood control reservoirs which I have shown on this exhibit is a system of 19 detention reservoirs located all on the tributaries of the Tennessee River and none on the main river itself. Four of these are located on the Hiwassee River, four on the French Broad and its tributaries, five on the Holston River and its tributaries, two on the Little Tennessee River, one on the Clinch River proper and three on the Emory River and its tributaries, the Emory in turn being a tributary of the Clinch. These reservoirs are of the type known as detention or dry reservoirs. They are designed solely for flood control protection and have no other purpose in mind and achieve no other result. Normally they are dry and they will collect the flood waters only in event of those floods in excess of a certain capacity. They

develop absolutely no power, because they are normally dry a very, very large percentage of the time. As soon as they collect any flood waters, these waters are released just as soon as it is safe to do so from the standpoint of the streams below the reservoir. Insofar as being detention or dry reservoirs are concerned, these are exactly the same type as the Miami Conservancy District reservoirs in the [fol. 485] State of Ohio. There is a certain difference which is important in regard to the method of operating these reservoirs.

This system of flood control reservoirs would in no way be inconsistent with or interfere with the low dam navigation plan for providing a 9-foot channel from Paducah to Knoxville outlined in the report of the Chief of Engineers in House Document 328 and previously discussed by Major Putnam.

The outlined control works of these reservoirs have openings of two different classes. One of these openings would be without any gates and, therefore, could not be closed off at any time. The remainder of the openings would be of a second class which could be controlled by gates automatically. The purpose of having this type of control is to make full and effective use of the entire net storage volume of each reservoir for cutting off the flood peak. This is accomplished by maintaining at all times while the reservoir is being filled, a constant flow through the total area of the openings in the dam. When the floods begin, the gates, as well as the unobstructed openings, are all functioning and carrying water. As the reservoir begins to fill, there would be a definite automatic schedule which would bring a gradual closure of the gates, with the result there would be maintained at all times a constant flow through the openings and at the time the reservoir had just filled all of the gates would be closed and the entire amount of this constant flow would be passing through the openings which have no control on them.

The amount of this discharge, which would be constant while the reservoir was filling, varies for each of the reservoirs, depending upon the tributary drainage area, the expected flood at that point, and the capacity of the reservoir, and the amount of constant flow as given by the openings and distribution between openings which have no gates and those which have gates was all determined during the course of this study.

[fol. 486] During the emptying program, the opening of the lowest reservoir of each of these principal tributary groups would be maintained at a constant and fixed discharge and that would be such as to keep the discharge below the reservoir and all of the way down as nearly as possible at bank full stage. The upper reservoirs on each tributary would have their discharge varied within a considerable range, so as to suit conditions obtaining for any particular flood. From the lowest reservoir the attempt would be to keep the rate of emptying down to a point where it would not raise the streams below higher than the bank-full stage. Furthermore, this would be automatic. It would not be subject to anybody's guess during any particular flood and would have a definite schedule, just the same as the filling schedule, and the amount released is definitely fixed for every reservoir. That would not be changed at all by anyone. No one would have any authority to do that. The filling program is very definite, very important, and would not be subject to any alteration.

I deem the system I have described to be the best practicable system for flood control to protect the Tennessee River and its tributaries, because I have arrived at it by applying to the conditions obtaining on the Tennessee River and its tributaries those basic principles which govern the design of a proper flood control type of reservoir. The first basic principle is that consideration should be given in the design of such system first to the protection of human life and second to the protection to various types of property. The second principle is that flood control, in order to be positive, must control all floods; therefore, it must be capable of controlling the maximum flood to be expected. Any flood control system which simply decreases the frequency of immersion of areas that are subject to high frequency of flooding and is not protection against the maximum flood to be expected is really a dangerous thing, because it leads people to [fol. 487] think that they are having a larger amount of protection than they have. They will encroach upon these areas that are subject to inundation, and when the great flood does come at rare intervals, the loss of life will probably be very much greater than if they had not gotten the impression that they were being fully protected. So that this second principle is a very important one, with the primary purpose of a real flood control system, because it must protect against the maximum flood to be expected.

The relation between lands permanently flooded and those sought to be protected is another very fundamental point. It would be a matter of flying in the face of economics to attempt to protect a certain amount of property from flood damage if in doing so you have destroyed more property and buildings than were being protected.

The use of automatic operation is one that has long been fully recognized as of major importance in the design of flood control structures. In my opinion, we are very far from having arrived at the point where it is possible during the greatest of storms to predict with accuracy what is ahead of us even for a relatively short period of time. Therefore, instead of attempting to predict operations of control works for each particular flood, they should be designed for the greatest flood to be expected and their operation should always be in conformity with that condition. Therefore, it should be made automatic as nearly as possible, so it will not be subject to any tampering by people attempting to predict what is going to happen.

With reference to the difference in principle applicable to the protection against flood waters originating on tributaries and flood waters originating in the main stream, in general it is best to take care of the flood waters on the tributaries of the stream by flood control reservoirs of the detention or dry type, and to take care of the flood inflows to the main stream by channel improvement which may be either of the by-pass or of the levee or some other [fol. 488] type such as excavation of the channels for its improvement. The application of these principles leads to the determination that this system should obtain the maximum practicable protection at and above Chattanooga, because only about 7% or 8% of the damage occurs below that point, and in addition, one that is designed primarily for protection at Chattanooga will afford a share of protection below Chattanooga. I have located all of the reservoirs on the tributaries, because the major portion of property, except in the case of the Emory River, that should be protected, lies on the main river. After investigation of conditions at Chattanooga, and also at a number of other towns which are subject to flood damage, I decided it would be necessary to protect Chattanooga by a system of levees, even after the reduction which is accomplished by the flood control reservoirs.

I have studied the elements of the so-called TVA Unified Plan contained in its report to Congress on March 31, 1936, in so far as they could in any way affect floods.

The map of the entire Tennessee basin, (offered and received in evidence as Complainants' Exhibit 354), shows in red the dams and reservoirs of the TVA Unified Plan recommended to Congress, and likewise in blue existing power reservoirs on the Tennessee River and tributaries in May, 1933.

The table (offered and received in evidence as Complainants' Exhibit 355) shows for each of the reservoirs of the TVA Unified Plan, which would in any way affect floods at and above Chattanooga, the name, the stream on which located, the tributary drainage area, the dependable flood storage volume in the greatest flood to be expected, the flood storage volume used by me in determination of non-dependable modification which might be effected by the TVA Unified Plan during the greatest flood to be expected, and the lands flooded by each of these reservoirs when water is at normal pool level.

[fol. 489] There are six of the dams and reservoirs of the TVA Unified Plan which would affect floods at and above Chattanooga in some measure. Three of these are located on the tributaries, namely, Fontana on Little Tennessee, Norris on Clinch, and Fowlers Bend on Hiwassee River. The three on the main river are Chickamauga, Watts Bar and Coulter Shoals. The dependable flood storage volume of these six reservoirs is 620,000 acre feet in contrast to the net storage volume of 6,000,000 acre feet of my recommended system shown in this exhibit. These six reservoirs, when at normal pool level, would flood 110,870 acres permanently, in contrast to the 19 reservoirs of my recommended system which would temporarily flood at the time of the greatest flood to be expected 132,000 acres. Dependable flood storage volume, as it is used in this exhibit, means the volume of the reservoir between the top of the gates on the dam and the elevation beyond which it is declared it is not intended to go for power or any other purposes except flood control storage.

The reservoirs of my recommended system would provide a large measure of effective control over 78% of the total tributary drainage area above Chattanooga. The reservoirs of the TVA Unified Plan would provide a certain

measure of control over 25% of the drainage area above Chattanooga.

The table (offered and received in evidence as Complainants' Exhibit 356) lists the towns and cities on the main river and also on the Emory River and shows the comparisons of reductions in maximum flood stage which would be brought about by my recommended plan of flood control and the non-dependable reductions which might be brought about by the TVA Unified Plan. The first column after the names of the cities shows the maximum recorded stage during the past at each one of those towns or cities. The next column shows the maximum stage which I estimate would be attained during the greatest flood to be expected without any flood control of any sort. The column headed "C" shows [fol. 490] the reduced stage which would be brought about by the operation of the reservoirs of my recommended system of flood control. The column headed "D" shows the non-dependable reduced flood stage which might be brought about by the operation of the reservoirs of the TVA Unified Plan. And for the purpose of reference, there is added a column showing the stage at which the submergence begins at each of these towns and cities. If the dependable flood storage volume only were to be considered, the reductions which would be effected by the operation of the TVA Unified Plan would be so much less than the reductions shown by the differences between columns "C" and "D" that they would be negligible.

The chart, (offered and received in evidence as Complainants' Exhibit 357), is a companion one to the one submitted earlier in my testimony, which showed solely the predicted maximum flood to be expected at Knoxville, Loudon and Chattanooga. There have now been added two separate lines for each diagram in general, one of which shows the flow of this maximum flood as it would be reduced by my recommended flood control system, and the second line shows the flow of that same flood as it might be reduced by the operation of the reservoirs of the TVA Unified Plan. This is a modification which I have termed "Non-dependable". That is, it is based upon the possibility of having a greater amount of space available in the TVA reservoirs than the dependable storage volume if some of the power storage might happen to have been drawn down at the time of the occurrence of the flood. This exhibit shows that un-

der the TVA high dam plan at the time of the maximum flood, the peak at Knoxville of 68.3 ft. would not be reduced, whereas my recommended system would reduce the peak stage by 41.2 ft. to 27.1 ft. At Loudon the peak of the flood would be reduced by the TVA high dam plan from 71.5 ft. to 66.2 ft., whereas my recommended system would reduce the peak by 37.6 ft. to 33.9 ft. The estimated reductions by the TVA high dam plan are non-dependable and it is just a possibility that they might be brought about by the [fol. 491] operation of the TVA Unified Plan. At Chattanooga, where I have predicted that there is every possibility of the occurrence of a flood which would have a maximum stage of 73 ft., my recommended flood control system would reduce that stage to 53.9 ft., which is a reduction of 19.1 ft. The non-dependable reduction which might be brought about by the operation of the TVA Unified Plan would reduce the stage of 73 ft. down to a stage of 67.7 ft., or a non-dependable reduction of 5.3 ft. This exhibit does not show what reductions might be achieved by the dependable storage of the dams in the TVA Unified Plan as that amount was so much smaller than the possible volume of non-dependable storage, which I used for this graph, that it would be insignificant and I did not make any computations of it.

The graph (offered and received in evidence as Complainants' Exhibit 358) shows the reduction in flow each day which would be brought about at Harriman by my recommended flood control system during the greatest flood to be expected on the Emory River. It indicates that my predicted maximum stage of 63.7 ft. would be reduced by the operation of my recommended reservoir system to a stage of 39.8 ft. In contrast to this, the TVA Unified Plan would not reduce this stage any amount whatsoever, because it makes no provision for flood protection of any kind on the Emory River.

I testified yesterday to the numerous places which I have visited recently to look into the matter of flood damages. On the occasion of my visit to Oakdale, which is just above Harriman on the Emory River and which was the scene of a great deal of destruction during that flood, I took particular pains to examine into all of the records that I could find from local information, and at one particular point it was possible to observe that the round house of the CNO

& TP Railroad had apparently never been restored since that flood, and it was possible quite definitely to identify that the picture shown in the TVA Unified Report to Congress was a picture of that round house immediately after that flood.

[fol. 492] The chart (offered and received in evidence as Complainants' Exhibit 359) is a companion exhibit to Exhibit 357, which was a comparison of my recommended flood control system and of the TVA Unified Plan at three specific cities, including Chattanooga and two above. Complainants' Exhibit 359 shows a comparison through the medium of a profile for the entire river between Knoxville and Chattanooga. The profile shows first the bottom of the river; second, it shows the location of the dams of the TVA Unified Plan between Knoxville and Chattanooga; next, the low water line of the river; then, in green is shown the peak stages, which would be reached by the maximum flood to be expected under conditions existing in May 1933, without these three proposed TVA dams in existence. The purple line shows the non-dependable modification of this maximum flood which I have predicted, resulting from the possible operation of the TVA Unified Plan. The red line marked "E" shows the modification of this great flood, which would be brought about at each point along the river by my recommended flood control system with no TVA dams in existence. In contrast, of course, the purple line shows the TVA dams in existence, shows those three main river dams in existence, because they are a part of it, and in order to properly picture the conditions resulting from the TVA Unified Plan, those dams had to be considered in existence. Again, I show the towns and cities in this stretch of river affected by floods and elevations where flood damage occurs, by horizontal line at the foot of the vertical line, indicating the position of each of these towns and cities.

A comparison of Complainants' Exhibits 357 and 359 shows that the operation of my recommended system at Chattanooga would bring about a reduction in the maximum stage of this great flood of 19.1 ft. as compared with a possible non-dependable reduction of 5.3 ft. from the operation of the TVA Unified Plan. In my opinion, the resultant protection rendered by the TVA Unified Plan would not be sufficient to render practicable the construction of levees at Chattanooga to protect that city

against the greatest flood to be expected, whereas the maximum protection afforded by my plan would be sufficient to render practicable the construction of such levees at Chattanooga.

Bulletin No. 40 of the Division of Geology of the State of Tennessee on page 52 states that during the devastating flood of March 1929 about 50 lives were lost in central Tennessee. The report of the United States Department of Agriculture Weather Bureau Climatological data, Tennessee Section, issued at Nashville, Tennessee, in March, 1929, states:

"The Emory River, a small mountain stream emptying into Clinch River, is said to have risen 50 feet in 12 hours, flooding portions of Morgan and Roane Counties, and drowning at least 22 persons. Most of these bodies had not been recovered 10 days after the flood."

I have already pointed out that the TVA Unified Plan affords no protection on the Emory River. The TVA Unified Plan would bring no reduction whatsoever at Knoxville. (At this point, counsel for defendants stated that the TVA Plan includes no dam above Knoxville.)

The table (offered and received in evidence as Complainants' Exhibit 360) is a comparison in acres of the lands flooded by the flood control system designed by myself and by the TVA Unified Plan. My plan does not permanently flood any land. The TVA Unified Plan reservoirs flood permanently at normal pool level a total of 374,840 acres. The Army Engineer Corps estimated that 480,000 acres of land would be overflowed in the Tennessee Valley between Knoxville and Paducah by the 500 year flood. My system floods temporarily approximately 132,000 acres. The TVA Unified Plan will flood permanently more than $\frac{2}{3}$ as much land as the Army Engineers estimated would be flooded in the 500 year flood, if we take into account the total areas of land flooded by the TVA Unified Plan, the ratio being 375,000 to 480,000. The figure of 480,000 acres refers to [fol. 494] the main river between Knoxville and Paducah and does not include the tributaries. Therefore, the figure of 375,000 is not directly comparable to the figure of 480,000. A comparable figure is one of 330,720, which is the amount flooded by the TVA Unified Plan between Knoxville and Paducah; that ratio is about two-thirds.

I estimate that \$81,133,600 would be the total construction cost of my recommended flood control system, if its construction had been initiated about the same time that work on the TVA Unified Plan was begun and had been prosecuted without large delays, so that a large portion of the work would now be nearing completion. The estimated cost of the TVA Unified Plan, excluding the cost of Wilson Dam, as shown in the estimate submitted to Congress in the Appropriations Bill Hearing, is approximately \$473,650,000.

In my estimated total construction cost of something over \$81,000,000 for my flood control system, \$8,136,000 was included for a dam and reservoir on Clinch River located at substantially the same site where Norris Dam now stands and furnishing 1,300,000 acre feet of storage for flood control purposes. The estimated cost of Norris Dam in the TVA Unified Plan is approximately \$36,000,000, including the cost of the town of Norris and some additional lands.

The dependable flood storage volume of the Norris Reservoir in the greatest flood to be expected is 497,000 acre feet. It is absolutely necessary in hydro-electric power projects to have certain dead storage for the purpose of concentrating the fall for power development. That is the storage that lies below what is sometimes called the "maximum draw-down" on a navigation reservoir. The amount of that dead storage in the Norris Reservoir is 570,000 acre feet.

In connection with my study and investigation and my recommended flood control system, I inspected the site of [fol. 495] all the proposed dams on that system. I consider feasible the construction of dams of the height which I proposed at these sites and that the cost would have been substantially as I have estimated it. I estimated that the annual cost of operation and maintenance of my recommended flood control system would be \$400,000 per year.

Referring to Complainants' Exhibit 360, dealing with the lands flooded, on which I show that the greatest amount of land temporarily flooded under my recommended plan would be 132,285 acres, my recommended plan would interfere very slightly with the normal use of those lands as they are now being used. They could continue to be cultivated every year with only an occasional loss of crops,

when they were flooded temporarily for the relatively small period of time that they would be flooded.

Firm power is that power which is available every day in the year in every year. It is also referred to very commonly as prime power or primary power. The objective of the development of any hydro-electric system is to obtain the greatest possible amount of firm power, which is controlled both by the lowest flow which is ever to be expected during the driest periods that may be experienced and by extreme high water which reduces the head at the dam, due to the fact that the water below the dam rises faster than the water going over the dam, resulting in a net loss of head. Therefore, it is important that there be sufficient generating equipment installed so that under that reduced head additional flow can be passed through to make up for that deficiency and thus maintain the fixed amount of prime power at flood times as well as at low water times.

Secondary power is that which is not available throughout the year. It is quite usual to divide it into classes, either according to the number of months that it is available in a low water year or the number of months that it is available in an average water year.

[fol. 496] The load of a utility system is the demand upon that system for power expressed in kilowatts or horsepower. It is not a constant quantity, but varies from hour to hour during the day and varies for the days of the week and varies for the month of the year and varies from year to year according to business conditions.

The load factor of a public utility system is the ratio of the average demand for power on that system expressed in kilowatts, for some stated period of time, to the maximum demand for power on that system within that same period of time. For instance, an annual load factor refers to a stated period of one year and is the concept that is referred to generally as the load factor of a public utility system.

What is meant by the term energy as compared with the term power can best be illustrated by the example of a lighting load in a home. Suppose you have 10 lamps installed in that home, each one of which when you buy it is marked 100 watts. Then, the power installation in that home is 10×100 or 1,000 watts, and that is what is called 1 kilowatt. The energy, on the other hand, is controlled not only by the power installation, which in this case which I am citing is 1 kilowatt, but also by the number of hours that those

lamps are used during some stated period of time. For instance, if the lamps are burned continuously 10 hours per day, then the energy demand or energy consumption is 10 kilowatt-hours, and that is the unit which appears on everybody's monthly bill when you pay for your electric service.

I am familiar with the normal annual load factor of large public utility systems in the Tennessee basin area. Today it is about 60%. I have made a study of the additional firm power which would be produced on a 60% annual load factor by the construction of the plants included in the TVA Unified Plan, over and above the firm power capacity of the Wilson power plant as it was originally constructed. I estimate that the additional firm power would be 1,072,000 kilowatts [fol. 497] at 60% annual load factor.

Under my recommended flood control plan, no power of any class would be produced, either firm or secondary.

The graph, (offered and received in evidence as Complainants' Exhibit 361), shows the figures which I have previously testified about with reference to costs and additional power. By the term cost I mean the construction cost, not operating cost.

I have made a study of the power and flood control functions of the proposed dam and reservoir on the Clinch River in my recommended system in comparison with the same functions of the Norris Dam and reservoir as constructed in the TVA Unified Plan. The chart (offered and received in evidence as Complainants' Exhibit 362) is a comparison of the power and flood control functions of the Norris Dam and reservoir as it now exists, as a part of the TVA Unified Plan, with the proposed dam and reservoir on Clinch River which is included as part of my recommended flood control system. My recommended dam on the Clinch River is shown on the right hand section of this drawing and Norris Dam as built on the left.

The sole purpose of the reservoir colored yellow behind the dam in my recommended plan shown on the right hand side of Complainants' Exhibit 362 is to provide the dependable flood control storage as part of my recommended flood control system. It is intended to release storage as quickly as is consistent with safety to the river below, and its release is controlled by no other consideration. The reservoir would normally be dry, as is indicated by the term which I have used a number of times, a dry or detention

reservoir. There would be no power of any kind whatsoever produced by the water collected in this reservoir.

Absolutely no power can be incidentally produced by a dam that impounds no water permanently, such as this dam on Clinch River in my recommended flood control system. That is because it must be kept empty. At all normal times [fol. 498] it presents practically no obstruction to the flow of water. It is practically the same as if the dam were not there. The water is passing right through the openings in the bottom of the dam. In a pure flood control system, the reservoirs should not impound any water permanently, because the primary and sole function of a flood control system is to control floods and as soon as you impound any water permanently you have taken up a part of that volume for another purpose which completely destroys it and eliminates it in so far as any flood control function is concerned.

The most notable example of such pure flood control systems in existence is the flood control system of the Miami Conservancy District in the State of Ohio, which is the pure flood control type. It produces absolutely no power. The dams of a pure flood control system never produce any power incidentally.

Referring back to Complainants' Exhibit 362, there are two principal factors which determine the amount of power that would be developed at Norris Dam or in fact at any dam. One is the height or head through which the water falls and the other is the quantity of water flowing. The sole purpose of the dead storage at Norris Dam which is colored in blue on the exhibit is to create a head for the production of power and it is permanently maintained for that purpose. It concentrates the fall of the river. It is a substitute for a natural fall, such as Niagara Falls, where you do not need to build a dam to create that head; nature provided it for you. There is absolutely no incidental flood control value to this dead storage shown in blue behind the Norris Dam.

The reservoir area indicated in red behind the Norris Dam in the TVA Unified Plan on Complainants' Exhibit 362 to distinguish it from the dead storage which is shown in blue, has two purposes as a power storage reservoir. One is that it can be drawn upon during the dry periods which usually [fol. 499] come in the summer and the late fall to produce additional flow through the generating units at the power house. It also serves to create an additional and variable

head to the permanent head which is created by the dead storage.

At Norris Dam the space for the purpose of power storage shown in red on the left hand side of Complainants' Exhibit 362 can create no dependable incidental flood storage, because there are certain months in the year when that is filled just the same as the dead storage is filled permanently and, of course, when it is filled it can serve no purpose of providing dependable incidental flood control. Whether or not any of that would be useful for that purpose would depend upon the stage of the reservoir when the flood happened.

The space in yellow shown on the left hand side of Complainants' Exhibit 362 shows the dependable flood control storage behind Norris Dam, to which I have referred in my previous testimony; that is, it is the part behind the top of the gates and the top of the volume which is designated as power storage. This volume indicated in yellow behind Norris Dam on the left hand side of Exhibit 362 can create no firm power at all.

In the popular sense a dam such as Norris Dam in the TVA Unified Plan and shown on the left hand side of Complainants' Exhibit 362 in reality consists of one dam for power and another for flood control. It is one dam, but there are certain dividing lines within the reservoir which definitely divide its functions into two parts that are very separate and distinct.

My proposed dam on the Clinch River shown on the right hand side of Complainants' Exhibit 362 would create a great deal more dependable flood control than the Norris Dam shown on the left hand side of Exhibit 362, because the net amount of dependable flood storage in my dam would be 1,300,000 acre feet, whereas the dependable flood storage volume behind the existing Norris Dam is 497,000 acre feet, the ratio being 2.6 in favor of my proposed dam.

[fol. 500] A pure flood control project can never incidentally produce any power and a pure power project can never produce any pure incidental flood control. If power is produced from a flood control dam, that dam, in my opinion, serves two separate and distinct purposes. One is production of power and the other is a provision of flood control. In such case the power production must be purposely arranged in addition to the flood control. It is a very separate function and in combining those two into one struc-

ture, it is the same as in general designing two separate structures which later are superimposed on each other.

I estimate that the amount of firm power from the plants included in the TVA Unified Plan, excluding Hales Bar, but including Wilson Dam, if completed and operated on a 100% annual load factor with regulation by the reservoirs on the tributaries only, would be 660,000 kilowatts at 100% annual load factor. The annual available firm energy under similar conditions would be 5,780,000,000 kilowatt hours per year. That amount of firm power and of firm energy is more than five times as great as it would be if the three power plants on the tributaries were not included in the TVA Unified Plan.

The firm power capacity from the plants included in the TVA Unified Plan, excluding Hales Bar but including Wilson Dam, if operated on a 60% annual load factor with regulation only by the tributary reservoirs, would be 1,100,000 kilowatts. The available annual energy, assuming the same conditions, would be 5,780,000,000 kilowatt hours per year.

The firm capacity from the plants included in the TVA Unified Plan, excluding from consideration the Hales Bar plant but including Wilson, and also including U. S. Nitrate No. 2 steam plant, if completed and operated on a 60% annual load factor, would be 1,200,000 kilowatts. The available firm energy would be 6,307,000,000 kilowatt hours per year.

[fol. 501] In such a low water year as 1925 during which the drought was very severe, I find that the total available energy for the plants included in the TVA Unified Plan, excluding Hales Bar but including Wilson Dam, would be 7,667,000,000 kilowatt hours. The firm energy would be the figure to which I have previously testified, 5,780,000,000 kilowatt hours per year, and the secondary energy would be 1,887,000,000 kilowatt hours. In such a low water year as 1925, none of that secondary energy would be available 75% of the time.

Assuming that I was required to produce 100,000 kilowatts of secondary power on a 100% load factor to be available at least 75% of the time in every calendar year from the plants included in the TVA Unified Plan, I would produce that amount of guaranteed nine months secondary power from water storage in the tributary reservoirs when no other source was available. The use of a portion of

the stored water in the tributary reservoirs to create secondary power instead of primary would, of course, reduce the amount of primary power available below that which I have previously testified. The use of the storage in the tributary reservoirs to produce this requirement of 100,000 kilowatts of guaranteed 9 months secondary power would result in reducing the firm power capacity of the TVA Unified Plan from 660,000 kilowatts on a 100% annual load factor to 625,000 kilowatts on that load factor. The corresponding amount of firm energy which could be produced would be 5,475,000,000 kilowatt hours per year. A corresponding amount of secondary energy available 75% of the time is 657,000,000 kilowatt hours per year and there would be 1,535,000,000 kilowatt hours of secondary energy available for a lesser amount of time.

Assuming I was required to produce 150,000 kilowatts of secondary power on a 100% load factor available for at least 75% of the time in every calendar year in the plants [fol. 502] included in the TVA Unified Plan, the firm power capacity of the TVA Unified Plan would be reduced from 660,000 kilowatts on a 100% load factor to 607,600 kilowatts on that load factor, and the amounts of energy produced would be: Firm energy, 5,322,000,000 kilowatt hours per year; guaranteed secondary energy available 75% of the time, 986,000,000 kilowatt hours per year; and secondary energy available a lesser period of time, 1,359,000,000 kilowatt hours per year.

Taking the same conditions except that 75,000 kilowatts of the designated type of secondary power be required to be produced, the firm power capacity of the TVA Unified Plan would be reduced from 660,000 kilowatts on a 100% load factor to 633,750 kilowatts on that load factor. The corresponding amounts of energy are: Firm, 5,552,000,000 kilowatt hours per year; guaranteed secondary energy available 75% of the time, 493,000,000 kilowatt hours a year; and secondary energy available a lesser period of time, 1,622,000,000 kilowatt hours per year.

From a study which I have made of the flow records at Chattanooga and Florence, Alabama, both of which are very long term records, I have determined that the year 1921 may be considered as a typical or average water year for the purpose of an estimate of the total available energy from the plants included in the TVA Unified Plan, exclud-

ing Hales Bar and including Wilson Dam. In such a year, those plants would produce 10,000,000,000 kilowatt hours of energy. The firm energy or primary energy which, of course, is fixed by the amount in the low water year remains the same as I have previously testified, 5,780,000,000 kilowatt hours per year. The remainder of the 10,000,000,000, or 4,220,000,000 kilowatt hours per year, is the secondary energy of such a typical or average low water year as 1921.

I have made a study of the firm power capacity of Wilson Dam as it was originally construed and without any increased capacity which has resulted or would result from [fol. 503] the construction of additional projects under the TVA Unified Plan. It was 27,700 kilowatts. That capacity does not depend upon the annual load factor. Wilson Dam power plant, excluding U. S. Nitrate No. 2 steam plant, was capable of producing 242,600,000 kilowatt hours per year at 100% load factor before the construction of any additional works by TVA. Assuming a 60% annual load factor, Wilson Dam power plant without the use of U. S. Nitrate No. 2 steam plant and without any benefit of the structures built by TVA could produce 145,600,000 kilowatt hours per year.

The completion of the works included in the TVA Unified Plan and the operation of the reservoirs on the tributaries only for regulation of the river would increase the firm power capacity of the Wilson Dam power plant at 60% annual load factor by 151,300 kilowatts and would increase the firm energy at 60% annual load factor by 795,200,000 kilowatt hours per year. The corresponding figures on a 100% annual load factor are 79,700 kilowatts of firm power capacity and 698,200,000 kilowatt hours per year increase of firm energy.

The only existing hydro-electric plants on the Tennessee River proper in existence in May, 1933, were Wilson Dam power plant and Hales Bar power plant. On the tributaries there were, of course, a large number, but the principal ones were first on the Ocoee River, the plants known as Ocoee No. 1 and Ocoee No. 2, and Blue Ridge. On the Little Tennessee River and its tributary the Cheoah River, there were three plants of the Aluminum Company of America known as Santeetlah, Cheoah, and Calderwood. On the Big

Pigeon River, there was the Waterville plant owned by a subsidiary of the Electric Bond & Share.

Assuming that under conditions existing in May, 1933, I had been commissioned to make all necessary investigations and design a plan for the development of the Tennessee River and its tributaries so as to produce rapidly a large amount of continuous firm power on the order of 600,000 to 700,000 kilowatts, suitable for use in an utility [fol. 504] system, disregarding the economics of its production, and subject only to the limitation that there should incidentally result a 9-foot channel for navigation in the Tennessee River from its mouth at Paducah to Knoxville, I would have selected on the main river, that is between Paducah and Knoxville, the dam sites known as Gilbertsville, Pickwick Landing, Wheeler, Gunter'sville, Chickamauga, Watts Bar, and Coulter Shoals. On the tributaries, I would have selected the sites known as Cove Creek or Norris on the Clinch River, the site known at one time as Powellson, or now as Fowlers Bend, on the Hiwassee River, and the site on the Little Tennessee River known as Fontana. These are the same sites as the sites included in the TVA Unified Plan.

I have stated in my testimony that my recommended flood control system is a system having as its sole purpose flood control on the Tennessee River and I have compared my system with the TVA Unified Plan submitted to Congress in its report of March 31, 1936. It is my considered judgment that the primary purpose of the TVA Unified Plan is not flood control.

I have also stated that under the conditions existing in May, 1933, if I had been commissioned to make all necessary investigations and design a plan for the development of the Tennessee River and its tributaries so as to produce rapidly a large amount of power on the order of 600,000 to 700,000 kilowatts, suitable for use in a utility system such as operates in this area, without regard to the economics of its production, and subject only to the limitation that the plan should incidentally result in a 9-foot channel from Paducah to Knoxville, I would select the same dam sites as are included in the TVA Unified Plan. As a result of my studies of flood control and power development on the Tennessee River, it is my considered judgment that the

primary purpose of the TVA Unified Plan is power development with incidental navigation facilities and incidental [fol. 505] flood control of a degree that is inadequate.

Cross-examination:

Taking Complainants' Exhibit 362, I obtained the figure of 497,000 acre feet of flood storage at Norris from a compilation of all of the various figures that have been made available to the public and which have come to my attention in regard to the storage volume and the proposed controlled elevation for the Norris Dam. That is my best estimate of the amount of space which is covered by the gates above the spillway. I have not assumed that that is possibly available for flood control. I have said definitely in my testimony that that is the dependable flood control storage which according to the best sources available to me is reserved solely for flood control purposes. The space which I have indicated might be used for flood control is a part of the power storage added to the dependable flood control storage. That is a part of the pink area added to the yellow.

My dam at the site of Norris has absolutely no provision for low water releases for navigation purposes below. I have clearly testified that it is designed as the sole purpose of flood protection and has no other purpose of any sort.

If I were required to build a dam for navigation and flood control purposes, I cannot say whether I could build the dam which I have designed, because it would require a specification as to the type of navigation that was to be provided. If I were required to release water during the low water season and build up the navigable depths below, I could not build that dam. I could not achieve the result of releasing water during the low water season for navigation purposes.

The maximum 24-hour discharge of the Clinch River during my assumed flood, which would produce a maximum stage of 73 feet at Chattanooga, was 253,000 cu. ft. per second at the mouth of the Clinch River where the total [fol. 506] drainage area is 3,584 square miles. That is considerably in excess of the drainage area at Norris. I would say, as I recall it, the drainage area at Norris Dam is about 2,960 square miles, as the Emory River enters the Clinch a short distance above its confluence with the Tennessee

and below Norris. I assumed that the maximum daily discharge at the dam site was about 200,000 cu. ft. per second, maximum 24 hours average.

I did not testify that the flood would last three days. I testified that the storm would last three days, but the flood would last over a longer period of time. I do not happen to have the figure readily available as to the total run-off in the area back of the site of Norris Dam, but it was 90% of the total run-off of 11 inches on the number of square miles above the dam.

I calculated the effect of Norris Dam on that flood. The total run-off of the Norris Dam during the number of days that that flood continued, both during and after the duration of the storm, and including the natural base flow which would have occurred anyhow and which would have gone down the river anyhow if there had been no storm, is approximately 1,750,000 acre-feet. Excluding that base flow, it was somewhat less, on the order of 1,560,000 acre-feet. That includes a period of ten days, including the first day of the storm. That is an ample time to retain the total amount of water there in order to block that out at the time of any possible danger at Chattanooga. Assuming that you stored the entire flow of the Clinch River at the dam site and in order to attain that result at the beginning of the flood period, the dam would be somewhat higher than the height shown by me on Complainants' Exhibit 362 for my proposed dam.

The elevation of the reservoir that would be required to take care of that entire flood would be approximately an elevation of 1010, assuming, of course, that the reservoir were completely empty at the beginning of the storing of [fol. 507] the flood waters. In order to find out what elevation of water you can start with and still have enough to take care of the entire flood would require information as to the elevation at which you were going to arrive if you had stored it. The storing of water would have to begin at approximately elevation 972 if my estimated entire flow of the river during those ten days were to be stored without exceeding the elevation of 1034 in Norris reservoir. I am quite confident of that figure, based, of course, as I stated before, upon the best published or public information which I have been able to get as to the volumes of Norris reservoir at different elevations.

You would have a million acre-feet in the reservoir measured from the bottom at approximately elevation 982. I calculate the total reservoir capacity to 1034 at the top of the gates to be 2,567,000 acre-feet. If you take off 1,560,000 acre-feet and did not exceed the elevation of 1034, you would start at approximately 982.

I would say approximately 12 or 13 days would be the time that the flood crest at Chattanooga would be above a gauge of 30, without any modification of that flood by storage of the waters. Those flood heights would not be substantially reduced by the retention of that total flow at the Norris Dam site. You can reduce the flood at Chattanooga by cutting out the 200,000 cubic feet of flow at the Clinch River at the site of the dam by reason of preventing the entire amount of it from getting to Chattanooga. I would not say you can reduce it substantially. I have not made a figure as to how much that reservoir would reduce that amount. That reservoir is capable of taking out the entire 200,000 cubic feet per second over the entire period if it is at the elevation which I have testified to when that storm begins. I got my information about the dams to a certain extent out of the Unified Report. I did pay attention to the statement there that that dam was to have seasonal operation. In figuring my non-dependable flood control [fol. 508] capacity, I did not assume at the time of the flood that the water was considerably below spillway level. In giving the figure of dependable flood storage volume, I assumed the water would be at the spillway. That dam could be operated to do substantially more than I testified was the dependable part of the operation if operated with proper control, as I interpret it, but not by the stated plan of the TVA for operation of that reservoir.

I assumed that my theoretical flood would occur as late as early April, which is practically the end of the flood season. I assumed that the flood would occur practically on the first of April, and in figuring the non-dependable reduction that might be accomplished by the three tributary reservoirs of the TVA Unified Plan, I have Norris Dam at an elevation of 1,007, as the elevation at which the water would stand when that flood began.

I assumed the maximum 24-hour average flow during that storm at the Fowler Bend site, where the Hiwassee Dam is now being constructed, is 98,000 second feet.

I have no figures available as to the effect on the gauge height by eliminating the entire flow of the Clinch River at the Norris Dam site.

I assumed the maximum 24-hour average flow at Chattanooga corresponding to the predicted maximum stage of 73 feet is about 680,000 cubic feet per second. It is not correct to state that by retaining the entire flow of the Clinch River at the Norris Dam site you could have reduced the flood at Chattanooga by about 30 per cent. I do not have the percentage, but I know that you could not have reduced the flow by 30 per cent. Hydraulic engineering in flood design is not so simple as comparing the 200,000 cubic feet per second which I gave you to the 600 odd thousand cubic feet per second, which I gave you as the flow at Chattanooga. You cannot take two designated flows many miles [fol. 509] above Chattanooga and simply take it from the flow at Chattanooga, because of having stored a certain amount in the river at Chattanooga during the storm. You take a 24-hour period for this average and the same at the dam site.

I am giving this theoretical flood, that is what my testimony is about. The peak at Norris Dam would, according to my estimate, occur on the 4th day, counting the first day of the storm as the first day and would arrive at Chattanooga about the 7th or 8th day. If you desired to discharge some of the water out of Norris ahead of the peak on the Tennessee, you could have released water if you were legally permitted.

"Q. When do you calculate the peaks on the Ohio-Mississippi at Cairo as compared to the peak of the Tennessee arriving at that point?

A. I made no study of the floods on the Ohio and the Mississippi, either in themselves, or in relation to floods on the Tennessee River. I am, therefore, unable to answer the question.

Q. But then, your plan does not purport to be for the alleviation of the floods on the Mississippi?

A. My plan, as I think I very clearly stated, was to show the maximum practical protection on the Tennessee River and its tributaries, and it gave no consideration either to the Ohio nor to the Mississippi Rivers.

Q. In other words, had you been directed to achieve the alleviation of the flood waters of the Mississippi, as well as

the flood waters of the Tennessee, you would not have devised that kind of system?

A. I could not say what kind of system I would have devised, because I have not studied that problem, Mr. Fly.

Q. The question is, you did not plan your dams to perform that double function, did you?

A. No, no, most decidedly not."

I have studied House Document 328 and have noted the flood of December, 1926. I know that that study of that flood played a very prominent part in the computations of House [fol. 510] Document 328. I don't recall the figures, but I would not doubt that in that particular flood the Army Engineers estimated that Norris Dam alone would have reduced the flood peak at Chattanooga by 5.7 ft.


As to whether page 196 of House Document 328 shows that the Army Engineers estimated that the combined use of Norris, Coulter Shoals, Watts Bar and Chickamauga would have reduced the peak at Chattanooga by 12.1 feet, several cases are referred to on that page and the Army Engineers figured so many different combinations it would take quite a little time to make accurate statements as to what those various reductions were exactly.

Examination by the Court:

In Complainant's Exhibit 362, the acre feet in blue on Norris Dam dead storage is 570,000 and in the pink is 1,500,000 and in the yellow is 497,000 acre feet, although the width (height) of the blue is much greater than the width (height) of the pink, because the ratio of height required is not in direct proportion to the volume of storage produced because the water spreads out as you go higher. In Complainants' Exhibit 362 the volumes in acre feet of the areas back of Norris Dam colored respectively, blue, pink and yellow are not proportional to the heights of such colored areas because the ratio of height is not in direct proportion to the volume of storage produced because the water spreads out as you go higher. The total acre feet which Norris Dam would contain would be 2,557,000 up to the top of the gates raised to their highest position. If you multiply cubic feet per second for one day by two, you have the number of acre feet that will produce in one day.

"Judge Allen: I understand that it is your testimony that this Norris Dam could hold the entire flood flow of the Clinch River?

[fol. 510a] The Witness: Oh, yes, there is enough volume there if it is empty, yes.

Judge Allen: And that if  did, there would still be a certain, considerable amount of what you call dead storage.

The Witness: Storage below that point, assuming in filling it during that storm you just filled it up to the top of the spillway gates, yes, that is correct."

Cross-examination continued:

I know that one of the possibilities that the Army Engineers contemplated in House Document 328 was that the Tennessee River dams would be used for navigation and flood control and power.

[fol. 511] I have read in a casual manner a report in regard to the operation of the Norris Dam as concerns flood peaks on the Tennessee in the 1936 flood, which report forms part of a recently released publication of hearings before a Congressional Committee on what is in the laymen's language known as the Seven TVA Bill. But I have not given any specific study to that report. I believe it is correct that Norris Dam was utilized at that time to retain the entire flow of the Clinch River at that point. That is my recollection of the statement that was made. I do not know for what length period.

I designed for the U. S. Engineers Corps the outlet control works of the Pleasant Hill, Ohio, flood control dam of the Muskingum Valley Conservancy District. That is one of the 14 flood control dams of the Muskingum water shed conservancy district. The Pleasant Hill project has what is called a conservation pool, the purpose of which as I understand it was for combined navigation, industrial, domestic and recreational uses in the river below.

I have not directed any other multiple purpose projects, with the exception of the Blue Nile to which I have referred. That did have a multiple purpose. I was not in charge of that Ethiopian expedition. That was a little too rough for me. There was a problem of flood control that assumed great national importance because that lake is a sacred lake, and the islands and shores of it are dotted with literally hundred of churches, and the question of proper flood control in regard to those churches was one that concerned the

Government of Ethiopia very much and had to be carefully watched and taken care of in connection with the use of waters of the lake for irrigation purposes. I would call it a combination of flood control and irrigation. There were no other major functions whatsoever. Storage of flood waters was released in dry seasons for irrigation.

[fol. 512] I was a consultant in connection with the outlet tunnels of the Fort Peck Dam which was being erected by the Corps of Engineers and was 242 ft. high. I could not say what the cost was. That dam is designed for navigation by low water regulation, flood control, irrigation and ultimately for power. Penstocks are now being provided for power installation. I could not testify to the fact that the plan is to release a minimum flow of 30,000 cubic feet per second at all times during the navigation season, because the points on which I was brought in did not involve that question of the low water release. I was a member there of a special board that was formed at the request of the Chief of Engineers of the United States Army.

I am not familiar with the Tygart project which I think is on the Tygart, a tributary to the Monongahela. I really couldn't say that I know it is also a combined flood control and navigation project. I have never had any connection with it or even very much of a casual interest.

I did no work on the Boulder Dam project, except to visit it in connection with certain functions which the Boulder project performs in connection with the aqueduct of the metropolitan water district of Southern California. The aqueduct leads from Parker Dam, some considerable distance below Boulder Dam, and now under construction. At that point the water supply is fed by the discharges from Boulder Dam. Boulder Dam serves a combined function of navigation, flood control, irrigation and water supply. I could not testify that it has an installed capacity for the generation of electricity of 660,000 kilowatts. I know it is a very large installation. It cost something on the order of \$165,000,000. It has no navigation lock.

[fol. 513] By Mr. Fly:

"Q. Mr. Kurtz, are there many projects with this plan of yours for the automatic control of gates on the dams?

A. The Muskingum Dams have gate control instead of purely automatic Miami type, but I do not think that they

have any automatic features. I am not positive on that point. The one with which I was connected did not.

Q. Now, under your scheme you do have the automatic controls, do you not?

A. Yes, that is true.

Q. And has the Army constructed any projects with controls of that sort?

A. So far as I know they have not. The only one I know they have constructed is the Muskingum pure flood control the one to which I have just referred.

Q. You do know, don't you, Mr. Kurtz, that the reservoirs recommended in House Document 259, that all of them were designed for control by human beings who were operating them.

A. I must say, Mr. Fly, I am not certain on that point. I do not think that that document went into details that far. It may, and I missed that.

Q. You do not know of any recommendation of any structure by the Army where that automatic system of control is installed or is to be installed, do you?

A. No.

Q. Are you familiar, Mr. Kurtz, with the report of the Mississippi River Commission regarding a comprehensive system of reservoirs for the Mississippi River Valley, including the Tennessee?

A. I have reviewed the portion of that report which relates to the reservoirs that were proposed on the Tennessee River as a part of that comprehensive system.

Q. You do know, do you not, that the Commission recommended that a plan of reservoirs be designated as the only feasible way for further flood control on the Mississippi.

Mr. R. T. Jackson: I object to that question unless the document is exhibited to the witness, and the part that counsel is inquiring about.

Mr. Fly: The witness can state. I will be glad to show him the document.

Judge Allen: He can state whether he knows. That is the question, is it? Read the question.

[fol. 513a] (Question read by reporter.)

A. No, sir, the answer is I do not know that.

Mr. R. T. Jackson: Neither do I.

A. I do not say it is not there, understand."

Referring to my system of reservoirs, I can state what continuous unimpeded flow through each of my reservoirs has been assumed. I will read these continuous rates of release when the reservoirs are filling in the same order that the reservoirs are listed in Complainants' Exhibit 353: Painter Creek, 22,400 cubic feet per second; Solomon Ferry, 42,000 cubic feet per second; Dandridge, 65,000 cubic feet per second; Kikers Ferry, 60,000 cubic feet per second; Island Mills, 2,000 cubic feet per second; Bachman Ford, 24,000 cubic feet per second; Burgoinsville, 36,000 cubic feet per second; Three Springs, 35,000 cubic feet per second; Strawberry Plains, 40,000 cubic feet per second; Fontana, 50,000 cubic feet per second; Davis Ferry, 60,000 cubic feet per second; Cove Creek, 20,000 cubic feet per second; Frankfort, 2,500 cubic feet per second; Milliken Branch, 16,500 [fol. 514] cubic feet per second; Wartburg, 250 cubic feet per second; Coleman, 29,000 cubic feet per second; Apalachia, 21,000 cubic feet per second; Austral, 16,000 cubic feet per second. Charleston, 46,000 cubic feet per second. I did not total it. It did not have any significance.

I went into very considerable detail of the design of these dams in order to be able to prepare the estimates of cost which I have submitted. I have figures as to the height of the dams and more of the estimates, quantities and details on my work sheets, yardages of concrete and all of those details which are necessary in order to prepare an estimate of cost of the general nature and accuracy of the one about which I have testified, of the total estimated construction cost. The heights of these 19 dams measured from low water to spillway crest, are as follows: Island Mills, 169 ft.; Bachman Ford, 137 ft.; Surgoinsville, 96 ft.; Three Springs, 83 ft.; Strawberry Plains, 78 ft.; Painter Creek, 123 ft.; Solomon Ferry, 76 ft.; Dandridge, 112 ft.; Kikers Ferry, 72 ft.; Cove Creek, 171 ft.; Frankfort, 170 ft.; Milliken Branch, 257 ft.; Wartburg, 68 ft.; Coleman, 184 ft.; Apalachia, 156 ft.; Austral, 136 ft.; Charleston, 58 ft.; Fontana, between 275 and 300 ft.; Davis Ferry, 80 ft. In addition to the conduit type of outlet, there is a spillway provided for each of these dams. In all cases it is an overflow type of spillway over a masonry dam, concrete dam.

The thickness of the dam is a rather difficult thing to give in a spillway dam, because it is rounded at the top. At the very crest it is zero, then you go down and it increases as you go down the slope. In the case of non-over-

flow dams, it is possible to give the top. I think we can take the top width of the non-overflow sections of 6, 8 to 10 feet, depending upon the height of the dam and whether or not a roadway was to be built across it. In all other cases, the type of spillway dam was made to conform to the jet of water passing over the top. The lower nappe of that [fol. 515] stream was at a depth of 5 feet. I did not provide for extended bases for further increasing the height of the dams. It is the complete structure in itself providing for no extensions of any kind.

I do not know of any example of a private power company developing a navigable river from its head to its mouth with consecutive navigation pools, comparable to that of the TVA Plan. There is not to my knowledge a single one in the United States.

Hales Bar Dam was the only dam providing the navigable channel constructed on the Tennessee River proper by a private power company before 1933. I have not included navigation in regard to the length of channel in my study, but that dam made navigable whatever the distance is between Hales Bar and Chattanooga. It makes slack water up to Chattanooga.

The following dams of substantial size were erected by the power companies on the various tributaries of the Tennessee River and were in existence in May, 1933: Parksville, Ocoee No. 1, Blue Ridge, Andrews, Calderwood, Cheoah, Santeetlah, Waterville, Greenville, Elizabethton, Columbia, Murphy. There are some of those not very large, but that is a representative list of the larger ones. It is an obvious fact that the power companies have been interested in those sites on the tributaries where they have the high height and the narrow gorges. At the same time, with the single exception of Hales Bar, they have avoided putting up dams on the main stream.

The main stream dams, such as those in the TVA Plan, are relatively undesirable from the power viewpoint, because of the reduction of the head in periods of high water, if they are not combined with steam plants which can carry the load at the time when the head is reduced or a large number of additional units installed to take care of the deficiencies in the head at times of great flow. The power companies do not have that particular difficulty in the tributaries, because the dams are higher. The dams on the tributaries are not subject to that reduction of head,

because they lend themselves to greater height for development of power and the amount of loss in high water is more or less constant, regardless of the height of the dam you build. Therefore, the relative effect becomes smaller and smaller the higher you build the dam. If I were going into the power business, whether I would go out in those tributaries and build that type of dam would depend as to the amount of power I would want to produce. Whether I would go up there if I were looking for a greater amount of power would depend upon the quantity of power I would want to develop. I do not think the power companies have made a mistake by going up there rather than going to the main stream, because their problems were gradual, their additional demands were small and they went to the source where they could get that given amount of power cheapest. They did not have a sudden demand for a large block of firm power.

I know that a number of the power companies have taken out or applied for preliminary permits over a period of years on the Tennessee. I happen to know particularly of a preliminary application, at least, that was made for Cove Creek, and I know the Aurora Landing project was passed around the engineering offices of this country as a promoting job for a good many years. I don't know the names of the plants, but I do know the preliminary application to which I referred for Cove Creek was made by The Tennessee Electric Power Company or its predecessor, or some subsidiary.

At a stage of 51 ft. in the city of Chattanooga, I know that the water would cover quite a lot of business area. I do not have the figures of the area or by streets or anything like that. I could not give the detail as to the part of Market and Broad Streets it would cover.

[fol. 517] As I testified, the estimates of flood damages presented in my exhibit are all taken from tables 2 to 57, inclusive, of Appendix N, House Document 328. I did not make any independent estimate of flood damages at any plant.

I do not recall giving that Document's estimate on the 500 year flood at a \$14,350,000 figure at Chattanooga, but it seems to me that I used the flood damages only for the purpose of determining those points which were in need of protection and I made no attempt to estimate the flood benefits or estimate the damages, but I considered those as re-

liable engineering data, and engineering data to show for what purpose and at what points protection is needed in the Tennessee Valley. I adopted the figure on page 39 of House Document 328, of \$1,780,000 average annual damage at Chattanooga. Referring to Complainants' Exhibit 349, the difference between my figure of \$1,400,000 and the Army figure at the top of page 39 in House Document 328 of \$1,780,000 is due to the fact that my exhibit covers only flood damages to cities and towns, railways and highways; whereas, the figure of \$1,780,000 includes damage to agricultural lands and crops. The same explanation applies to my figure of \$11,009,000 as compared to the Army figure of \$14,003,000. I am under the impression that the Army Engineers' figures, which I have used, do not include indirect damages, such as is due to interrupted traffic and business, unsanitary conditions, spread of disease, deaths, personal injuries, depreciation of land, the general discouragement of business, discouragement of population and that sort of thing, but I do not like that to be a positive statement. I don't think the matter is entirely clear in House Document 328, but that Document does state on page 39:

"This does not include indirect damages, such as loss due to interrupted traffic and business, unsanitary conditions and spread of disease due to flooding of towns, depreciation of land due to overflow, etc., which are difficult to assess. These indirect damages, if eliminated, would greatly increase the value of flood control."

[fol. 518] I know that all of those things, other than ascertainable property damages, such as loss of life, personal injury, impairment of health, unsanitary conditions, interruptions to trade generally, shipment and travel and the damage to trade and commerce of the city by thwarting its growth, the discouragement of population increase, depreciation of property values in general, all of those flow as results of a continuing flood menace. Any of these large floods will disable a considerable number of railroad and highway and terminal facilities. That is particularly true in the city of Chattanooga. I don't recall that the Army made any separate estimate of railway damages in Chattanooga, but I do know that the railway damages on the Emory are very high and bulk very large compared with the total for the entire Tennessee River basin. I find that I was too hasty in

my statement. The Army Engineers do have a separate estimate for those damages in the city of Chattanooga and I find from my exhibit that the railway damages at Chattanooga by the great flood which the United States Engineer Corps adopted is given in their tabulations as \$237,000 and the annual damage to railways at Chattanooga is given as \$3,318. I am reading that off of my exhibit under the heading of "railways" under the summary and under the head "Main Tennessee River" and sub-item "Chattanooga".

In mentioning the total costs of the Unified Plan, as I referred to it in the report of the TVA of March, 1936, I included, with the exception of the original cost of Wilson Dam, everything that is included in the tabulation of the principal features of the present and proposed dam and reservoir projects of the TVA appearing on page 403 of the Hearings Before the Subcommittee of the Appropriations Committee of the House of Representatives, Second Deficiency Appropriation Bill of 1937 (Complainants' Exhibit 116). It includes everything shown there which specifies only those specific items; it includes \$500,000 for [fol. 519] raising Wilson Dam; it includes the cost of the lock built by the Corps of Engineers of the United States Army at Wheeler and the cost of Norris Dam, and highways, town of Norris, forest lands, etc. Otherwise, it is the estimated cost of the ultimate stage of the TVA Unified Plan. From this notation, which says that includes highways, town of Norris, forest lands, etc., I would not say that there are any properties in the vicinity of Norris that are excluded. I didn't know what the "etc." includes. It does include the power house and generators and all that. That is quite apparent. The table also includes Fontana at an estimated cost at the ultimate stage of \$51,000,000. In making my estimate of power available, I assumed the completion of all those projects including Fontana and I also assumed the full installation to use all water power at the dams.

I have never had general control of any general scheme of flood control on any river. I have not had the direction and supervision of any entire project devoted to flood control.

Redirect examination:

I have direct knowledge of the fact that private interests have taken steps looking to the development of the Aurora

Landing, now known as Gilbertsville, site at which the TVA proposes to construct a project. I also understand that much of the site at Pickwick Landing was owned by private interests, having acquired it for power purposes. I learned when I was Resident Engineer at Muscle Shoals that prior to the construction of Wilson Dam, much or all of that site was owned by a private power company, having acquired it for a power development. I have been informed directly that the Gunter'sville site, at least a part of it, was owned by a private power company interest, holding it for development for power purposes. It is also true that the site of Norris Dam was owned in whole or in part by private power interest [fol. 520] ests for the development of power. It is a fact that similarly the site on the Hiwassee and at Fontana were owned by private interests for power developments. It happens that at Hiwassee, I have a very intimate knowledge of that, because I made a couple of reports for one of the principal owners of that project a good many years ago. I also know that it is a fact the Wheeler Dam site was likewise owned in whole or in part by private power companies for power development. I have the same sort of information in regard to Wheeler.

I estimated the total reductions at Chattanooga from the use of all of the TVA reservoirs in the TVA Unified Plan above Chattanooga for an amount of flood control storage greater than the dependable amount and have already testified to that figure.

I stated on cross examination that in making my estimates as to possible reductions from the TVA reservoirs above Chattanooga during the maximum flood, I did not consider merely the dependable storage at Norris, but assumed that Norris might be as low as elevation 1,007, at the time of the occurrence of the flood around the first of April. I made that assumption because I took particular pains to try to get the most reliable official information that I could in regard to the plans for operation of the three tributary reservoirs, and in the case of Norris, I was fortunately able to secure very definite statements made by Dr. A. E. Morgan before the Subcommittee of the House Committee on Appropriations of the House of Representatives on the Second Deficiency Bill of 1937. He did not state 1,007 ft., he stated quite definitely there that by the end of January, it would be up to 1,010 ft. and they would hold it there until the first of April. But I was a little more liberal to them and I adopted 1,007.

In the case of storage used for power, such as that shown in the pink area of my Norris Dam diagram on Complain- [fol. 521] ants' Exhibit 362, every effort is made to have the storage areas filled at the end of the flood season and at the beginning of the dry season.

The flow at Chattanooga would not be reduced by an amount equivalent to the amount of or volume of flow which might be stopped at Norris. There is no quick and easy direct relation which can be used. It is a question of long, elaborate, detailed hydraulic computation, taking into account many technical figures. It cannot be reduced to a simple formula. What I have previously described as natural valley storage is one of the major factors entering into that problem.

I testified that the total dependable storage of my recommended flood control plan in case of a maximum flood above Chattanooga would be approximately ten times as great as the dependable storage of the TVA recommended plan under the same circumstances above Norris. The amount of reduction in the case of a maximum flood is not directly proportional to the volume of flood storage which you have. The Court pointed out that I have in the pink area on my exhibit showing Norris Dam approximately three times as great a volume in acre feet as I have in the colored area below, even though the vertical depth of the lower block is greater than the upper block. I explained to the Court that that was because the contour of the reservoir widened out as you reach the top, and therefore a lesser vertical height would produce a greater volume in acre feet of storage. That same principle illustrates the reason why reduction in a space of a maximum flood is not proportional to the amount of flood storage which you have. That is, for instance, applied to this particular valley on Norris Dam, one might say that 570,000 acre feet at the dam would reduce the stage by the total depth of the blue area, whereas the same reduction at the top of the pink area would only reduce it about one-third of the total depth of the pink area. The [fol. 522] same general principle holds in both cases. That principle is directly applicable to the difference in storage capacities provided by my recommended plan and the TVA Unified Plan.

Examination by the Court:

Norris Dam would have to provide dependable storage of about 1,750,000 acre feet to take care of my theoretical ten day flood waters from the Clinch River, if no water at all were released during that ten day period from the area above Norris Dam. On Complainants' Exhibit 362 on the drawing of Norris Dam in the pink area, there is the heading "Power Storage Creates Head and Storage for Additional Power Production in Summer and Fall." That means that that is the usual period when the natural stream flows are low, and you draw upon that supply of stored water to increase the low flow and bring it up to a higher point so that it can maintain a certain desired amount of firm power. That statement applies to the 1,500,000 acre feet in the pink area, so that 1,500,000 acre feet are kept for power storage to create head and storage in the summer and the Fall. It would be possible not to use this 1,500,000 acre feet for the creation of power storage, but to hold that space in the dam available for flood control. The only limitations I would make there would be this, that in this case any water released during the period that was being so controlled would have to be through either the generating units or through the free discharge outlets which have been provided, and there would be some limitation on the manipulation. Above that point, they could lower the gates and let it go or hold it as they saw fit. But in general, it is correct that if an operating rule were made that we will not go above such and such an elevation except for flood control purposes, any or all of that whatever part anybody might designate as an operating rule could be reserved solely for flood storage, and in that way being added to the [fol. 523] amount of dependable storage shown. I would not say that the dam could be seasonally operated to produce the number of dependable storage in acre feet which I say is necessary to take care of the flood waters of the Clinch River, because in my understanding "seasonal operation" means that you would empty it in the Summer and fill it as soon as you could when the rains begin. That is my usual use of the term "seasonal operation". It would have to be held all of the time empty except when this great flood occurred. Then you would let it out just as soon thereafter as possible. You would not save it for anything, any other purpose, but you would let it out as soon as it was

safe to let it go down the river. Otherwise you would not have it empty when the next flood occurred. If there were no provisions for the generation of power at Norris Dam, the dam could be used to secure flood control. I have not investigated the capacity of those free outlets. It might be if I were designing it for that purpose, I would want more of those free outlets. I would want a different type of construction. But this structure could be used to secure flood control with a change in the operating rules, if there is sufficient outlet capacity to operate it in accordance with the rules. All of the dams in the TVA's system could be used to secure a certain measure of flood control.

Redirect examination continued:

Any power dam and reservoir, where the reservoir is drawn down seasonally for power production purposes, has a certain measure of non-dependable flood control, but whether or not it will be effective depends upon whether the flood happens to come at the time when it is drawn down.

Examination by the Court:

The floods come at any time between December and April, but the four greatest floods of record at the City of Chattanooga [fol. 524] nooga have all occurred in March or as late as the third of April. That is not saying that that is a fixed rule of nature, but is a fact which I took into consideration when I made my calculations in all of my work, and it was an important element in the decisions which I reached. That much we know; I am not estimating that.

If the area shown in pink on Norris Dam were reserved for dependable flood control storage down to elevation 955 as shown, and if the reservoir were never lowered below 955, there would be power, but it would be limited to the natural flow of the stream. It would be just run-of-river power.

In my opinion it would not be possible so to operate Norris Dam that there would be a dependable storage in acre feet sufficient to accommodate the flood on the Clinch River in the months in which floods do occur and in which they have occurred and then fill the reservoir and use the space in the reservoir for the creation of power because of the fact that the incidence of these great floods in four cases

of record has come at the end of the rainy season, and if you wait until then to fill it, the amount you could fill would be relatively small. I don't say it would be zero but you would have lost all of this large flow between December and April and you would only be able to store what came after that period about the first of April. I do not recall the manner of operation of Norris Dam last Spring. I don't know at what level they began to store or anything about that. I am not familiar enough with that report to which I referred earlier to say as to just how they operated.

(Thereupon counsel for complainants read the statement of Dr. Morgan from Complainants' Exhibit 116 on the Second Deficiency Appropriations Bill of 1937, at page 374 dealing with the elevation of Norris reservoir on April 1 each year and counsel for defendants also read certain extracts.)

(The witness was excused.)

[fol. 525]

OFFERS IN EVIDENCE

(Thereupon counsel for complainants asked to have marked as Complainants' Exhibit 364 for identification the Hearings before the Committee on Interstate and Foreign Commerce, House of Representatives, 74th Congress, First Session; as Complainants' Exhibit 365 for identification the Hearings before the Committee on Military Affairs, House of Representatives, 74th Congress, First Session; and as Complainants' Exhibit 366 for identification the Hearings before the Committee on Military Affairs, House of Representatives, 74th Congress, First Session, Volume 2, from which complainants desired to offer certain excerpts, and the following occurred):

"Mr. Fly: Your Honor, I do not know what these exhibits are, except I know one of them is hearings on some bill other than the Tennessee Valley Authority. We naturally object to that one. It is a public utility holding company bill, I believe.

Mr. S. D. L. Jackson: In connection with that from Complainants' Exhibit for identification 364 complainants offer excerpts on the following pages—and in that connection if

I may read just the first part of this excerpt from page 1947—

Mr. Fly: I object to reading that.

Judge Allen: What report is that?

Mr. S. D. L. Jackson: This is from the hearings of the Interstate and Foreign Commerce Committee, House of Representatives.

Mr. Fly: A Public Utility Holding Company bill.

Mr. S. D. L. Jackson: That is correct, and that committee called, requested the Tennessee Valley Authority to appear before it, and the first sentence of the hearing is this, if I may read it:

‘Mr. Lilienthal: Mr. Chairman and gentlemen of the Committee, my name is David E. Lilienthal, I am a member of the Board of Directors of the Tennessee Valley Authority. I am appearing before your Committee in response to the request of the Committee directed to the Board of the Authority.’

Then he testified at some length. The excerpt I have just read is one of those we desire to offer. I would like to [fol. 526] state to the Court and for the record, the other excerpts from this volume that we desire to offer, and I apprehend the Court’s ruling will probably be the same as it was when excerpts were offered from previous committee hearings. In that event we would like to preserve our record, and at such time take such proper steps as may be advisable.

Judge Allen: What is the objection to that?

Mr. Fly: The committee did not have a report on the activities of the Tennessee Valley Authority, but just appeared in response to the summons of the Appropriations Committee.

Judge Allen: Was this a hearing on the S. E. C. bill?

Mr. S. D. L. Jackson: No sir; on the Wheeler-Rayburn bill, at least the Public Utility Holding bill which was passed by the Congress in the summer of 1935. I might say otherwise, it will appear in evidence or evidence will be offered to show that prior to that date the National Power Policy Commission had been set up of which Mr. David E. Lilienthal was Chairman and Mr. Ickes was Secretary, that that report was made to the President and the President sent that to the Congress. That was on the holding

companies in the utility fields, and the bill was later passed by the Congress. I might say that that report is, I think defendants' exhibit, it is attached to the deposition of Joel David Wolfsohn, which will be offered by the complainants later on.

Mr. Fly: Your Honor, I think my friend has pretty well indicated the trouble we are borrowing here by trying the public utilities holding company bill, going into the hearings of that bill. We were called upon, not to report upon the work of the Tennessee Valley Authority. Mr. Lilienthal was there as a witness for the committee, concerning that measure, which has nothing to do with the Tennessee Valley Authority Act in any way. And he was not there in any official capacity to report on behalf of the Tennessee Valley Authority. He was there as a witness on the other bill. I might say he was at the request of the Congressional Committee, made to the Tennessee Valley Authority, and he stated he was appearing in behalf of the Tennessee Valley Authority for the Committee.

Judge Allen: Are you now making the offer of proof? You have indicated you presume the Court would exclude the exhibit.

Mr. S. D. L. Jackson: We are offering these in evidence. [fol. 527] Judge Allen: If you offer them in proof, if they are objected to, bear in mind the ruling of the Court adopted for the convenience of yourself and the complainants and the Authority, that we would not encumber this record with long statements of offers to prove. For that reason we suggest that you hand up to the Court, marked, these books. We will look at them and decide what can be admitted and what rejected; also the form of offer of proof which may be made."

(Thereupon complainants handed to the Court a list of the excerpts so offered and subsequently the following occurred:)

"Judge Allen: At the time the Court closed, Mr. Jackson had offered to introduce in evidence statements made in certain hearings before committees of the House of Representatives. The statements offered in complainants' exhibit 365, in the hearings before the Committee on Military Affairs, House of Representatives, 74th Congress, First Session, of the dates of March 28th, 29th, 30th, April 2, 3,

9 and 10, 1935; and the statements offered in complainants' exhibit 366, in the hearings before the same committee, same session of the same Congress, of May 20, 21, 22, 23, 1935, the Court considers admissible. But the Court makes the same ruling, that the entire statement will be received in evidence as it has made on previous occasions.

With reference to the hearings before the Committee on Interstate and Foreign Commerce of the House of Representatives, 74th Congress, First Session, part 3, of April 5, 9, 10, 11, 12, 15, 1935, on House resolution 5423, that is dealing with the subject of the Wheeler-Rayburn bill, the complainants offer to prove certain statements that Mr. Lilienthal made in this hearing; and these statements, the Court considers inadmissible as evidence. This was not a hearing upon a TVA Act, nor upon any appropriation thereunder, and the statements and the report of the hearing are excluded upon the ground the Court considers them immaterial and irrelevant. You may have your exception, Mr. Jackson, and the Court will appreciate it if in your offer to prove you will simply offer the pages as indicated.

Mr. S. D. L. Jackson: Then, your Honor, may I for the purpose of the record now state that complainants respectfully offer in evidence the extracts from exhibits 365 and 366. And I understand the Court has announced that the extracts will not be received, but I would like the record [fol. 528] to show that we offer the extracts as they appear marked in those volumes. And may I recite the pages, or hand the sheet to the reporter?

Judge Allen: It will be satisfactory to hand the sheet to the reporter, and the ruling of the Court upon the same is that the excerpts will not be received, but that the statement as a whole is received in evidence."

(The excerpts offered by complainants from Complainants' Exhibit 365 were as follows:)

On page 7, the last four lines at the bottom of the page; on page 24, the seven lines at the bottom of the page, beginning with the statement of Mr. Lilienthal, "In the first place the law"; on page 25, the two paragraphs beginning with the statement of Mr. Lilienthal, "The Congress has written into this law"; beginning with the statement of Mr. Lilienthal at the bottom of page 26 and extending through the first three lines of page 27; on page 28, the first three

questions and answers; on page 29, beginning with the question of Mr. Wilcox "What is the rate per kilowatt hour" and extending to the bottom of the page; on page 32, the first paragraph at the top of the page and the two paragraphs beginning "Furthermore, the legislatures of the States"; beginning on page 33 with the question of Mr. May, "You just stated that one-third of the gross revenues" and extending through the statement of Mr. Lilienthal on page 34, ending "the value of the property in Chattanooga"; on page 35, beginning with the sentence "In view of the policies of Congress" extending to the question of Mr. May near the bottom of the page; on page 36, the first three questions and answers; the two questions and answers at the bottom of page 36 and the first question and answer at the top of page 37; on page 37, the answer of Mr. Lilienthal beginning "That is part of the duties" and the subsequent two questions and answers; on page 38, in the middle of the page, the paragraph of Mr. Lilienthal beginning "The Knoxville situation"; on page 39, beginning with the question of Mr. May "Your company is not interested today" and extending through the statement of Mr. Lilienthal, ending "electricity should be widely available"; on page 40, the statement of Mr. Lilienthal beginning "We believe that the law"; the last two lines on page 47, and the first three lines on page 48; the last six lines on page 48 and the first question and answer on page 49; the last question and answer on page 49 and the first five lines on page 50; on page 50, the question of Mr. May "And that has been written down to \$21,000,000" and Mr. Lilienthal's answer thereto; on page 55, in the middle of the page, the two questions and answers beginning with the question of Mr. Maverick [fol. 529] "I want to ask"; on page 60, the question of Mr. Montet "Before we enter on that" and Mr. Lilienthal's answer thereto; on page 61 the two questions and answers beginning with the question of Mr. Montet "Do you consider the TVA" and the two questions and answers beginning with the question of Mr. Montet "Mr. Lilienthal, if you came down in Alabama"; on page 77, the first question and answer at the top of the page and the question of Mr. May beginning "Now I am conceding" and the first paragraph of Mr. Lilienthal's answer thereto.

(The excerpts offered by complainants from Complainants' Exhibit 366 were as follows:)

On page 591, in the middle of the page the two questions and answers beginning with the question of Mr. McLean "Is it not proper to say"; on page 594, beginning with the question of Mr. McLean "Let us assume that that is all" and extending to the bottom of the page; lines 5 to 8 on page 595; on page 833, the two questions and answers beginning with the question of Mr. Wilcox "There is one other question, Mr. Chairman"; lines 2 to 12 on page 834; beginning with the question by Mr. May on page 834 "Mr. Chairman, I just have a question or two" and extending through the statement of Mr. Lilienthal on page 836, ending "The CCC work is not related to power operation".

"Mr. S. D. L. Jackson: And may we have an exception to the ruling of the Court in refusing the extracts? And then, not waiving the benefit of our exception, but still claiming whatever benefits we may have thereunder, we now offer exhibits 365 and 366 with the request for permission to have the reporter copy into the record the extracts designated from those exhibits, which are the same extracts that we would like to offer separately had we been permitted. And may we have an exception to the Court's ruling on refusing to accept in evidence the extracts from exhibit 364, as shown on the attached sheet which the reporter will designate in the record, and may we have exception separately to that?"

(The excerpts offered by complainants from Complainants' Exhibit 364 were as follows:)

The first three sentences of Mr. Lilienthal on page 1947; on page 1952, beginning with the question of Mr. Cooper (interposing) "I believe you made" and extending through the statement of Mr. Lilienthal ending "at the time this figure was made up"; beginning on page 1953 with the question of Mr. Cooper "Now private utilities have to pay a great many taxes" and extending through the statement of [fol. 530] Mr. Lilienthal on page 1954 ending "Under the Railroad Land Grant Act you mean? Yes."; on page 1954 beginning with the question of Mr. Cooper "You have no Workmen's Compensation Tax to pay" and ending with Mr. Lilienthal's answer of "Yes" to the question "Do you have the franking privilege?"; on page 1955, beginning at the top of the page and extending through the statement of Mr. Lilienthal ending "Those figures may well be accurate;

I am unable to carry them in mind", and beginning with the question of Mr. Wadsworth "Referring again to the tax matter" and extending to the bottom of the page; the paragraph beginning at the bottom of page 1956 and the first paragraph on page 1957; on page 1957, the next to the last paragraph on the page and the first sentence of the last paragraph; beginning on page 1962 with the statement of Mr. Lilienthal "It is obvious that" and extending through the statement of Mr. Lilienthal on page 1963 "It would be a substantial amount."; on page 1964, beginning with the question of Mr. Wolverton "Let us see just how much difference" and ending with the statement of Mr. Lilienthal "I am perfectly willing to say that it is"; on page 1976, the two questions and answers beginning with the question of Mr. Bulwinkle "In getting the benefit back into the Treasury"; the last statement of Mr. Lilienthal on page 1980; beginning on page 1981 with the question of Mr. Cooper "Well I want to ask you this question" and extending through the paragraph on page 1982 ending "governmental activities to give out this information"; on page 1982, beginning with the question of Mr. Cooper "You have made speeches have you not" and extending to the last paragraph at the bottom of the page; on page 1990, the two questions and answers beginning with the question of Mr. Merritt "But you did have a tremendous leverage"; on page 1992, beginning with the question of Mr. Huddleston "Under the system you now have" and ending with the answer of Mr. Lilienthal "I think the cost for firm power is approximately 3 mills"; beginning with the statement of Mr. Lilienthal at the bottom of page 2018, "The citizens of two counties" and extending through the statement of Mr. Lilienthal on page 2019 ending "most of the people in those counties who use electricity have taken out membership"; on page 2022, beginning with the question of Mr. Pettengill "On this matter of publicity" and extending through the statement of Mr. Lilienthal ending "the preparation of information in the form of press releases."; on page 2023, the two questions and answers beginning with the question of Mr. Pettengill "Are you familiar with the statute"; beginning on page 2027 with the statement of Mr. Lilienthal "Furthermore, while it is not required by law," and extending through the answer of Mr. Lilienthal on page 2029, "The principle you have laid down, I agree with, entirely."; on page 2030, Mr. Pettengill's question beginning "My idea is that" and ending with

Mr. Lilienthal's answer "Well yes; in that form, I would."; on page 2037, the entire statement of Mr. Pettengill beginning "There is just one more observation"; and beginning with the question of Mr. Cooper on page 2062, "Were State regulations supplemented when Congress passed the Tennessee Valley Authority Act" and extending through the statement of Mr. Lilienthal on page 2063, "I intended to state that in some States that had occurred, and it has, as everyone knows."

"Judge Allen: You may have your exception, and in order to make the Court's position clear, Mr. Jackson, you presented no specific authority in support of your position that the statements of Dr. Morgan with reference to an appropriation being made for the building of a certain dam or certain dams was admissible in evidence. The Court considered that matter, found no specific authority on it, and feeling that in the interest of—well, in the public interest, that a statement of that kind should be admitted because it constituted a quasi official report to the committee before Congress dealing with a specific subject. The Court feels it was liberal in making that ruling, and the Court does not intend to extend that ruling to hearings before any committee of Congress that might call someone to talk before it.

Mr. S. D. L. Jackson: Other than those that are directly related to the TVA statute.

Judge Allen: That is the ruling. The Court has noted that these particular excerpts in the excluded exhibit, No. 364, and the other excerpts which were offered by counsel for the complainants, have been marked in red. It will help the Court if counsel for the Authority wish to rely upon any particular excerpts in the statements that have been admitted, if they be marked in the color in which the Authority marked the other exhibits relied on."

Counsel for defendants then brought to the Court's attention the following excerpts from Complainants' Exhibit 365 (which excerpts are set forth in Appendix I following Defendants' Exhibits):

On page 24, the first two sentences of the paragraph beginning "There have been some suggestions"; beginning on page 24, the second line from the bottom of the page,

"Furthermore that duty" and extending through the sentence at the top of page 25, ending "almost the entire length of the spillway."; the first paragraph on page 26; on page 30, the two questions and answers beginning with the question by the Chairman, "This non-profit corporation"; on page 37, beginning with the question of Mr. May, "What was their original valuation" and extending through the statement of Mr. Lilienthal ending "We paid for the property as it stood"; on page 77, one sentence of Mr. Lilienthal [fol. 532] beginning "As to TVA, we never suggested"; the first thirteen lines on page 78; on page 92, the statement of Dr. Morgan beginning in the third line "The high dams" and extending through the sentence ending "There is no comparison between those high dams and the low dams."

Counsel for defendants then brought to the Court's attention the following excerpt from Complainants' Exhibit 366 (which excerpt is set forth in Appendix J following Defendants' Exhibits):

Beginning on page 826 with the question by Mr. Schaefer, "Mr. Lilienthal, I believe the last time you appeared * * *" and extending onto page 827 ending with the words by Mr. Lilienthal, "* * *" in terms of so many additional generators needed."

T. J. DAVIS was called as a witness on behalf of the complainants and, having been first duly sworn, was examined and testified as follows:

Direct examination:

I am 60 years old and reside at 1700 Duncan Avenue, Chattanooga. Farming is my occupation. I lived out in what is known as the Chickamauga Basin and owned a farm out there. I farmed a river bottom farm all my life.

I am acquainted with where the survey made by the TVA is and where their stakes are set out with reference to the bank of the river out in the Chickamauga Dam reservoir. Other gentlemen and I have estimated the value of the crops that were standing at the time that I made the estimate on these lands between the white stakes located by the Authority and the River Bank.

"Q. Tell the Court how many acres you estimated, and what crops you found standing upon the land, and whether or not you considered only the standing crops?"

Mr. Fly: May it please the Court, the over-all cost of [fol. 533] these projects has gone in here time and again, and I don't think the Court can have any possible interest in the details of the cost of these reservoirs or the amount that the farmers have been paid for the land that has been flooded, or the amount of crops that could have been grown on the land if it had not been taken for reservoir purposes. I fail to see any possible relevancy in this case.

Mr. Spears: If the Court please, if that was the point there might be something in it, but that is not what I am trying to prove at all.

Mr. Fly: What are you trying to prove?

Judge Allen: Yes, what are you trying to prove?

Mr. Spears: I am trying to prove, if your Honor please, that this so-called flood control don't amount to a thing in the world, that they cover up the same land that is flooded, eternally, instead of as it has been heretofore just occasionally, and that the damage as estimated by the Army Engineers above Chattanooga, to lands, is only \$43,000, and I propose to prove by these witnesses in the Chickamauga Basin alone they are covering up crops now standing on the land, on land that will produce crops now standing on the land, of \$400,000. It does not go to the value of the land. I am not trying to prove the value of the land. I am just trying to reflect on the good faith of the claim that this is a flood control project.

Judge Allen: On the statement of counsel the objection is sustained. The Court considers this testimony of this kind irrelevant and immaterial. You may have your exception."

(Counsel for complainants then stated that the testimony would go to show that the TVA flood control program is a sham and pretense, as the annual flood damage of the entire Tennessee Basin according to the Army Engineers is \$1,790,000 a year and the annual value of the crops which would otherwise be grown on the land flooded permanently by the TVA reservoirs would be six or eight times as much as the annual flood damage.)

"Judge Allen: Just a minute please. The Court will point out again to counsel the fact that by securing the benefit of bringing a joint bill here, seventeen complainants have to bear the burden of avoiding multifariousness. Now, if the Court were to go into the question of damage to every farmer, what was paid every farmer, and what his crops [fol. 534] were, we would have an impossibly unwieldy record. In our judgment it is not relevant and material to this controversy. You may have your exception.

Mr. Spears: If Your Honor please——

Judge Allen: Based on the statement of counsel the court rules that testimony of this kind is irrelevant and immaterial and you may have your exception.

Mr. Spears: If your Honor please, I don't want to be persistent, but I am not trying to prove the value of the land or the damage to the farmer.

Judge Allen: Well, you have stated what you expect to prove.

Mr. Spears: I am trying to prove that the public welfare——

Judge Allen: The Court considers that this testimony, on the statement of counsel, is irrelevant and immaterial, and you may have your exception. I might say that the Court does not simply consider these questions at the moment. The court is considering all of these questions all of the time, so that it is not necessary to stop and have an argument with counsel for an hour or two over every point that arises. The ruling will stand. Your statement stands as your offer to prove.

Mr. Spears: We except to your Honor's ruling, and let the statement stand as the offer to prove. I have a number of witnesses, the least I could get along with in this matter, —I have three teams out of two men each for about 15 or 20 days, and I want to let this witness' offer stand for the three——

Mr. R. T. Jackson: May we have an arrangement whereby if counsel is agreeable we submit an offer to prove with a list of the witnesses, without going through the formality of calling them to stand, and a brief statement of what they would prove, and then let that stand as the offer and the ruling on it?

Mr. Fly: We will accept the offer of proof, and the pur-

pose of the testimony as previously stated by counsel in this instance, as being typical of the other instances.

Mr. R. T. Jackson: Well, I don't think that is adequate. We have a number of witnesses.

Judge Allen: Mr. Spears, you may dictate the names of the witnesses you wish, who you claim support this proposition?

[fol. 535] Mr. Spears: Mr. Davis, Mr. Kinney, H. S. Sharp.

Judge Allen: Do you want to give the address of each witness?

Mr. Spears: Mr. Davis, Chattanooga; Mr. Kinney, Sale Creek.

Judge Allen: And their initials?

Mr. Spears: Mr. M. E. Shields, Bradley County. Now I want to make the same offer as to the Guntersville Basin. Mr. Chandler, will you come around?

Mr. Fly: We will stipulate that he has made it. Will you list the witnesses, Mr. Spears?

Mr. Spears: Yes, sir.

Mr. Fly: If that is satisfactory.

Mr. Spears: Mr. Eric Alsobrook, D. W. Culbert, Henry Kennamer, A. G. Chandler, J. H. Hennegar, M. F. Derrick, and J. D. Robbins.

Judge Allen: The same ruling as to these witnesses.

Mr. Spears: I want to state what they would prove. These witnesses, if allowed to testify, would prove that they estimated the corn standing on 22,000 to—

Judge Allen: Now Mr. Spears, I remind you that the Court asked counsel to be careful with reference to their offers of proof. We don't feel that when we have held matters are incompetent or irrelevant that the record should be cumbered with pages and pages of offers to prove. Does the Authority concede that these witnesses would testify substantially the same with reference to the Guntersville Dam?

Mr. Fly: As has been previously stated by counsel as to the Chickamauga Dam. We will stipulate as to all of them.

Mr. Spears: Will you stipulate that in the Guntersville Reservoir, that the crop, including corn, hay, and seed cotton is valued at \$829,650.00?

Mr. R. T. Jackson: Annually destroyed.

Mr. Fly: We have made our stipulation and concession, your Honor.

Mr. Spears: You agree that they would, if allowed to testify, prove, or testify to that effect?
[fol. 536] Mr. Fly: No, no.

Judge Allen: Now, Mr. Spears, the Court will permit the record to show that these witnesses would testify substantially the same with reference to the Guntersville Dam, or to any other dam you want to show, as you have offered to prove with reference to the Chickamauga Dam, and your offer to prove will be confined to that. If you want to write it out and submit it to the Court the Court will under Equity rule——

Mr. Spears: If your Honor please, there it is, right there, it is just three lines (indicating).

Judge Allen: The Court thinks that it has made plain that if the Complainants show that they fall into substantially the same category, and if substantially the same facts are shown with reference to what the complainants claim as their legal rights in this case, the Court feels that the complainants have been permitted to show their case. Now, are you willing to make an offer to prove that these gentlemen, if permitted to testify, would testify to substantially the same facts with reference to the Guntersville Dam as you want to show with reference to Chickamauga?

Mr. Spears: They did not testify to that.

Judge Allen: Suppose you make out your offer to prove and submit to the Court, and under equity rule 46 we will see that the record presents that clearly.

Mr. Spears: Now——

Judge Allen: The Court has ruled. The ruling of the Court will stand.

Mr. Spears: I understand that. I want to prove by these other witnesses also—Mr. Davis, come back to the stand. I want to ask one more question.

Mr. Fly: Can you state it?

Judge Allen: What is the question you want to ask?

Mr. Spears: I want to ask about the 1917 flood, if it was not practically coincidental in a great many respects with the normal lake line they will have at Chickamauga when completed.

Judge Martin: That is immaterial.

Judge Allen: The Court suggests, Mr. Spears, that you write out what you offer to prove and submit that to the Court and the Court will, under equity rule 46, make a clear statement of the question presented.

[fol. 537] Mr. Spears: I have got the same thing I want to prove with the Alabama witnesses with reference to Guntersville Dam.

Judge Allen: When we receive your statement, the Court, under equity rule 46, will make your offer to prove. You may proceed with the case.

Mr. R. T. Jackson: I am told, if your Honor please, there is at least in part a similar offer to be made with reference to the Wilson and Pickwick Dams. I assume that can be included in this offer without additional formality.

Judge Allen: Yes. The Court requests the offer to prove be submitted to the Court."

(The witness was excused.)

(At a subsequent session of the Court, counsel for complainants submitted the following written offer of proof of what these witnesses would have testified if they had been permitted:)

"Plaintiffs offered witnesses T. J. Davis, Jack Kenney and H. S. Sharp, who after qualifying to speak, as to the value of crops in the Chickamauga basin to be covered when Chickamauga Dam is completed, would have testified had they been permitted that the crops standing on the land in November, 1937, within the basin to be covered, were of a value in excess of \$407,000, a fair average annual value.

That the TVA stakes at elevation 683, now on the land, showing the normal pool level of the lake after completion of the dam was practically coincidental with the pool level of the 1917 flood.

Plaintiffs also offered qualified witnesses, to wit: Eric Alsobrook, D. W. Culbert, Henry Kennemer, A. G. Chandler, J. A. Hennegar, M. F. Derrick, and J. D. Robinson, who had they been allowed to testify, would have testified that the crops standing in the Guntersville basin, to be covered upon completion of the Guntersville Dam, were of an average annual value in excess of \$829,000, and that the stakes showing the pool level of the Guntersville lake upon completion of the dam covers more land than was covered by the 1917 flood.

Plaintiffs also offer to show by qualified witness A. E. Jackson, had he been allowed to testify, that the average

[fol. 538] annual crop produced in the Pickwick basin on the land normally cultivated would have been valued in excess of \$890,000.

That the average annual crop produced on the land normally cultivated in the Wheeler basin was in excess of \$1,000,000."

(At a later stage of the trial, the following occurred:)

"Judge Allen: The court has condensed somewhat the offer to prove with reference to the testimony of the farmers who appeared in court as witnesses, and whose testimony was excluded as being irrelevant and immaterial. The Court might say that it has tried to indicate to counsel how these offers to prove might be condensed and made more succinct. This offer to prove is given in connection with the testimony offered for the witnesses named.

Complainants offered as witnesses T. J. Davis, Jack Kenney and H. S. Sharp, who, if permitted to testify, would have testified that the crops standing on the land in November, 1937, within the basin to be covered when Chickamauga Dam is completed were of an average annual value in excess of \$407,000, and that the TVA stakes show that the normal pool level of the lake after completion of the dam will practically coincide with the pool level of the 1917 flood.

Plaintiffs also offered as witnesses Eric Alsobrook, D. W. Culbert, Henry Kennemer, A. G. Chandler, J. A. Hennegar, M. F. Derrick, and J. D. Robinson, who, if they had been permitted to testify, would have given similar testimony greater as to amount with reference to the average annual value of the crops standing in the Guntersville basin to be covered on completion of the Guntersville Dam, and similar testimony concerning the pool level of the Guntersville Lake.

Complainants offered as a witness A. E. Jackson who, had he been allowed to testify, would have given similar testimony, greater in amount as to the average annual value of the annual crops normally produced on the lake in the Pickwick and Wheeler basins.

Complainants may have their exception to the exclusion of this testimony, which is excluded by the Court upon the ground that it is immaterial and irrelevant to the issue presented in this controversy."

(Complainants further took exception to the revision by the Court of the written offer of proof submitted to the Court and had their written offer of proof copied into the record.)

[fol. 539] PHILIP SPORN was called as a witness on behalf of the complainants and, having been first duly sworn, was examined and testified as follows:

Direct examination:

I reside at Brooklyn, New York, and am 41 years of age. I am Vice President and Chief Engineer of the American Gas & Electric Company and Chief Engineer of the Appalachian Electric Power Company, the Kentucky-West Virginia Power Company, Inc., and the Kingsport Utilities, Inc. I was educated at Columbia University and there received the degree of Electrical Engineer. Subsequent to graduation, I took post graduate work there. For about a year and a half, I engaged in manufacturing engineering, after which I entered the field of public utility engineering and have been engaged in that field ever since. I entered the employ of the American Gas & Electric Company in 1920. Since that time, I have successively held the positions of project engineer, transmission and distribution engineer, plant engineer and assistant electric engineer. In 1927, I was made chief electric engineer of the American Gas & Electric Company and all its subsidiary companies. In 1932, I was made engineer of the American Gas & Electric Company and all its subsidiary companies. In 1934, I was made vice president and chief engineer of the American Gas & Electric Company and chief engineer of all its subsidiary companies.

In the 18 years that I have been with the American Gas & Electric Company, I have been intimately connected and I have had, for a large part of the time, direct supervision over the planning, construction and operation of the transmission, distribution and generating facilities of all of the [fol. 540] properties, which include one of the largest interconnected systems in the United States and one which accounts for approximately 5% of the central station energy generated in the United States. During that time, I have done a great deal of original work in the field of protection, transmission, distribution and generation. I have written

scores of papers, articles, and monographs, and presented them before the leading technical societies of the United States and abroad. And particularly in the last years, I have done a great deal of work on the problem of development of power supply for inter-connected systems. As chief engineer of the Appalachian Electric Power Company, the Kentucky-West Virginia Power Company and the Kingsport Utilities, I have had direct supervision of the planning and construction and the subsequent, following operations to assure satisfactory performance of their distribution, transmission and generating facilities. I have carried out this work for all of these companies ever since the formation of the Appalachian Electric Power Company in 1926, and for some of the companies dating back prior to that time.

I have made a recent study of the adequacy of the facilities of the Appalachian Electric Power Company, the Kingsport Utilities and the Kentucky-West Virginia Power Company in regard to the ability of these companies' transmission and generating facilities to carry their loads, at the present time and in the immediate future. By adequacy of facilities, I mean the availability in sufficient quantity of distribution, transmission and generation facilities at all times to assure ability to take care of the immediate loads and any reasonably expected increase in load with a sufficient margin to assure the supplying under all these [fol. 541] conditions of proper service. I think it is important to point out, however, that so far as generation is concerned, the planning is all pointed towards carrying what in general is a peak load that may occur for one hour in the year and never occur again in that particular year, and that, if under the conditions when the load comes on you are able to carry that load with an adequate margin of reserve, you can definitely state under those conditions you have had adequate facilities to take care of the load.

It is very definitely a good utility practice to have such surplus capacity as to permit the building of increased facilities should they be required before the existing facilities are overtaxed. That is, the proper planning of facilities takes into account the time factor needed to bring new facilities into operation, and, therefore, provides enough, but not much more than enough, in the way of reserve to take care of this situation. If excess reserves were provided for over and beyond reasonable requirements, the net

effect, of course, would be that the company would have investments that would not be productive, or if any attempt were made in the price charged to consumers to provide enough to carry these non-productive or non-used facilities, then it would result in cost to the public for services above what they normally would be. Also, facilities in excess of what is normally needed mean in many cases very much higher operating costs, because facilities operating at less than substantially full load are in general facilities not operated at the most economic point.

In making my study, we have given primary consideration to our generation facilities, and in so far as distribution and transmission facilities have an effect on the planning [fol. 542] and the functioning of our generating facilities, these have been considered also. We very definitely gave weight in our studies to the relationship that exists between the facilities of these three complainant companies about which we have made this study. The facilities of these three companies are very closely interconnected, as stated in testimony and an exhibit previously presented in this Court. Complainants' Exhibit 49 definitely shows the interconnection of the generating facilities and of the load centers of these three companies by very extensive high tension transmission lines and the integration of all these facilities into a single coordinated system. The existence of these integrated facilities, therefore, makes possible the planning of the generation requirements and of the power supply requirements of the three companies on a unified basis and thus offers considerable economies in the way of facilities.

These facilities which I have shown as physically interconnected on Exhibit 49 are operated together as a unit. All the load dispatching, that is the allocation of loads between the various generating stations and the determination of what amount of load will be carried on any particular unit or set of units, is all handled from a central dispatching point. The result of that unified operation is that these three companies are supplied in effect from a common pool, and I might add there is another series of economies that result from that. For one thing, in having the common system, it makes for closer coordination of the steam and hydro facilities. It makes possible also the coordination of the maintenance schedules to the end that at all times there is made possible the obtaining of the power supply of the three companies in the most economical manner.

[fols. 543-544] In the operation of the facilities of these three companies, there is also a relationship to the operation of the facilities of other companies. These three companies are interconnected with a group of affiliated companies in Ohio, Indiana and Michigan, and with non-affiliated companies in Tennessee and North Carolina. With each of these groups, close coordination is carried out, again to the end that the utmost that can be done in the way of obtaining a supply of power in the most economical manner at all times obtains.

In making a study of the loads that would be imposed on the facilities of the three companies, I have followed these methods: first, I have given consideration to the fact that I have had a very close contact and intimate familiarity with the operating history of each of these companies, going [fol. 545] back prior to the formation of the Appalachian Electric Power Company, secondly, I have maintained a very intimate contact with the plans of expansion, both immediate and prospective, of all of our major industrial power users, and it is necessary here to point out that in the case of these three companies the industrial use accounts for something like 85% of the total energy used on the system, and third, I have given weight to my knowledge of what is being done in the way of load building and the development of heavy current consuming devices, such as ranges, hot water heaters and similar devices in our domestic field. I have also considered the effect on our load of our extensive rural programs. Then, again too, I have checked very carefully the history of similar studies that were made years ago, that have passed into history, and have been able to take advantage of the knowledge so gained as upon production and actual performance, and I found that when all of these factors were taken into consideration, it was possible to project a long range, load curve growth, and heretofore, at any rate, we have found that utilizing such a curve we have been able to provide all the necessary facilities without any danger of being caught short.

I have described the factors that I considered in determining the ability of the facilities of these companies to carry the loads predicted by me within the future. That is, I have found that taking all these factors that I have enumerated into consideration, developing them into a long range load prediction curve, that it was possible to use that as a basis for determining the adequacy of existing facilities,

that is, determining what load would have to be carried by existing facilities. For this particular purpose, I have [fol. 546] given attention to the ten years starting with 1928 and ending with the year 1937, and I have projected the study and estimates of load predictions up to 1941.

The table (offered and received in evidence as Complainants' Exhibit 367) shows the combined one-hour peaks by months for the period shown in the table. It is to be noted that the pre-depression peak, which occurred in 1930 and amounted to 280,600 kilowatts, was not equalled or exceeded until 1935. The 1936 peak was in excess of that, but subsequent to that time, the load has receded and it has receded sharply at the present time.

I used data of the sort appearing on Complainants' Exhibit 367, as well as a great deal of other data, to project what I call the long time load growth, and I have prepared a graph showing that very thing.

On the graph (offered and received in evidence as Complainants' Exhibit 368) I have plotted in Curve A, the actual one-hour peaks as shown previously in tabulation form in Complainants' Exhibit 367. Based upon a study of this data and the data previously referred to, I have projected the long time load growth curve or the long range forecast curve shown as Curve "B". "A" is taken from the actual records. "B", in so far as it goes into the future, is my best estimate, but carefully made estimate, of the long time load trend in the future of the three companies. Within the limits of the period required to supply additional facilities, this is the same method which is customarily used in carrying on the utility business in determining when and how additional facilities should be provided. It is as near a single guide as we have been able to obtain, although we obviously use other guides.

[fol. 547] The combined system peak of these three companies in November, 1937, was 336,455 kilowatts, but the last peak for which we have any record which occurred on Tuesday, November 30, was actually only 312,000 kilowatts, and that is some 10% below the peak of 1936. I think it is interesting to note that the long range forecast would have given a load here of approximately 360,000 to 370,000 kilowatts as against the actual November peak of 310,000 kilowatts. My forecast of load as reflected in Complainants' Exhibit 368 does not take into account any possible loss of load by reason of a competitive power supply.

The tabulation (offered and received in evidence as Complainants' Exhibit 369) reflects the results of my study of the load carrying capacity of these three companies and shows the relationship between capacity available on the system and actual load that had to be carried, or in the case of the years 1938 to 1941, the load predicted and, therefore, is an index of the ability of the system to carry that load or an index of the adequacy of the facilities. In Column 1, we show the name plate rating for the various years, and in this following column, I show the firm capacity for a dry year basis. In the next column, I have shown the capacity that could be carried with the facilities available on a dry hydro year, and in Column 4, the capacity available from interconnections. Columns 5 and 6 are repetitions of similar data shown previously in Exhibit 367. Referring to Column 4 of Exhibit 369, the capacity coming from our own affiliated companies for the years 1928 and 1929 was 25,000 kilowatts and for the years 1930 to 1941, 40,000 kilowatts.

Examination by the Court:

"Name plate rating" means the capacity or is a summation of the capacities indicated in manufacturers' name [fol. 548] plates placed in each case on the generating facilities installed in the various plants. The capacity that that equipment purports to have as set out by the name plate is generally known as the name plate rating or name plate capacity as distinguished from the actual.

Direct examination continued:

Complainants' Exhibit 369 shows from 1928 to 1941 the combined loads and generating capacities of the three companies. That is, for the years shown where data is available, it shows the actual results. In the case of Columns 1, 2, and 3, it recites the capacity for the years 1938 to 1941 that is actually under construction at the present time. In the case of the last column it is, of course, as previously testified, my best judgment as to the loads that the system will be required to carry. Referring to the increase in 1938 and thereafter as to capacity, it represents the time when other plants are to come into operation.

The graph (offered and received in evidence as Complainants' Exhibit 370) shows curves A and B, which are exactly

the same as curves A and B on Complainants' Exhibit 368, but which have been included here for convenience of comparison. Curve C represents the firm combined system capacity on a dry year basis at the time of maximum system demand. Curve D shows the combined system capacity again on the dry year basis, including, however, capacity available to the three complainant companies from interconnections, but taking out of consideration the largest unit on the system, assumed to be out of service for maintenance or repairs. In all of my estimates of adequacy, I have allowed for taking out a unit. That is, to really get a clear and concise picture of the adequacy situation, all that has [fol. 549] to be done is to compare the curves A or B with curves C or D. The margin, for example, between curves A or B and Curve C, represents the margin available to the system in excess of the actual load that the system has to carry in the case of curve A, or the long range predicted load in the case of curve B. For the years 1938 to 1941, that is all we have available, of course. Curve C, however, assumes that we always operate in our normal manner, which means that we carry on our maintenance at a time when our system peak is down and during a period when hydro is plentiful. I have assumed the same amount of capacity available from interconnections during the years subsequent to 1937 as has been available in the year 1937. Curve D and the margin between it and the curves A or B is the measure of available margin between actual load and long time predicted load, and the capacity available to the system of the three companies under the unfavorable conditions of our largest unit out, by taking advantage of the capacity available to the system from its interconnections. It is apparent from this that that margin is actually greater than the corresponding margin between curve C and either curves B or A, which means, of course, that the capacity available to the system from those interconnections is in excess of the capacity of any of its largest units.

It is generally considered very conservative to make estimates on the basis of the largest unit out and we have found it very conservative ourselves. Never since we have operated these companies have they failed to meet their customers' load requirements. It has never been necessary for any of these companies to refuse additional business due to lack of facilities since they have been under our operation and supervision.

[fol. 550] On the basis of the studies that I have described, the present facilities of these companies are in my opinion entirely adequate to meet the present and immediate future loads on the system, and I think the data submitted as regards existing loads prove that. As regards loads in the immediate future, it is my considered opinion that with the capacity that we have actually under way, that is actually being constructed at the present time, there is not any question but that we will be able to take care of that adequately, with adequate margin, all our future requirements. We have carried this up to 1941. Within that period it would permit construction of additional facilities should any change require that. It is generally considered, and we have found that true by experience, I have myself, that working leisurely it is possible to add steam generating facilities in a period not to exceed about 20 months. It is possible, however, if necessary, to add facilities like that in less time, if there is reason for doing so.

Provided the proper interpretation is made of dependable capacity, firm capacity and dependable capacity are exactly the same. My own notion of what dependable capacity means is capacity that is available to carry the load that is assigned to that capacity in the system load curve at the time of system peak. That is what I mean by firm capacity on Complainants' Exhibit 369.

I am familiar with the values of dependable capacities as they are reported by my Company to the Federal Power Commission. The values furnished to the Federal Power Commission do not agree with the values of firm capacity used in Exhibit 369, Column 2. Each in its own way is correct. I have already stated what my own notion of firm [fol. 551] or dependable capacity is, but at the time the Federal Power Commission sent out its requests for information on system capacities, there was considerable confusion as to the meaning of the term. Incidentally, it ought to be pointed out that although I am familiar with a good deal of this information, it was not prepared under my direction. It is rather a statistical report. At any rate, at the time this report was called for, a definition was adopted for dependable capacity in the case of hydro capacity as "that capacity which the plants could carry under minimum flow under a 25% weekly load factor." That is not the load factor at which our hydro is operated. We operate these hydros in many cases at load factors consid-

ably below that, in many cases at load factors as low as one-half of that. It is apparent that the lower the load factor, that is for a given amount of water, the fewer the hours the capacity is operated, and the larger the load that would be able to be carried for those hours.

In planning for our capacity and in determining whether we need any additional capacity, we definitely do not use the Federal Power Commission data for that purpose. I have already stated that that is primarily a statistical report. The weakness of that report is the fact that it puts each plant on an isolated basis and on its own, so to speak, and in the dependable capacity rating placed in the report on each plant, all of the negative factors that would have an influence on reducing the capacity of each plant are put in. If this information were used directly in the determination of the capacity of the combined plants of the system operating as a practical operating system, we would be giving effect to all of the negative or reducing factors regardless of the fact of whether or not all these factors can or do occur simultaneously. As a matter of fact, we have ample operating experience and I know that many of those [fol. 552] factors do not occur simultaneously, and therefore we have not treated those factors as of simultaneous incidence in preparing column 2 on Exhibit 369. I have, however, given consideration in that column to all of the factors that our experience has shown are likely to have to be considered at any particular time and particularly at the time of peak load.

The facilities of these three companies have been designed and constructed to provide for increment expansion. That is a very definitely economical development of facilities. Increment expansion is provided in anticipation of load growths.

"Q. What, if any, effect, would be produced upon the company if a competitor took over all of that increment business expansion?

A. Well, it very definitely——

Judge Allen: The Court thinks it can assume what the effect would be.

Mr. R. T. Jackson: I think that is right, your Honor. We just wanted to have the record show that we have expert testimony as to the damages that would result from that line.

Judge Allen: The Court does not think it needs expert

testimony on that. The Court thinks a layman understands that, and we think there is proof in this record that the presence in the territory of a competitor with rates substantially lower for the classes of service than the complainants charge, would have a very definite effect.

Mr. R. T. Jackson: I was approaching the element of property value, which your Honors suggest is unnecessary to go into, as I understand.

Judge Allen: We consider it cumulative, that it has already been shown and is not necessary.

Mr. R. T. Jackson: I might just state we offer to prove, that if permitted to testify, the witness would state it would damage the increase in facilities of the company."

[fol. 553] Referring to Complainants' Exhibit 49, which shows the geographical relation between the properties and operating areas of these three complainant companies to Norris Dam of the TVA, I am familiar with some phases of what has been sometimes called the TVA Unified Plan. Assuming that that plan were executed so as to generate or provide for the generation of a large block of power with the dams interconnected by high tension transmission lines, it would be technically feasible to transmit the power from that grid system into the territories in which these three companies operate for distribution; and it is being done, of course. For example, in the case of the line from Boulder Dam to Los Angeles, it is being transmitted a distance of 270 miles. It is technically feasible to transmit the power for a distance of 250 miles. In order to transmit power from such a pool for such a distance, that is, 250 miles, it is not necessary to have intermediate feeding into the transmission line, or relaying.

Cross-examination:

I stated that the figures which I have used as the firm generating capacity were different from the figures reported to the Federal Power Commission and I explained the reason why. I have not a summation of those figures with me, but I believe I have enough data to give those figures plant by plant. The firm capacity I have shown in my Exhibit 369 for 1933 is 317,100 kilowatts and the reported capacity to the Federal Power Commission was 308,040 kilowatts.

I have shown on Complainants' Exhibit 369 that in 1937 we are relying upon a capacity available from interconnections of 67,000 kilowatts. Some of it is in contract form [fol. 2554] and the other is by operating agreements. In every case that capacity is available to the system if we need it at the time the systems need it and we have obtained it as a matter of record. Under our definition of firm power, it is firm power; that is, it is available to meet the peak demand and applies to the load curve at the time of system peak at the place which is assigned to that capacity in the load curve.

The companies with which we have these contracts are one with the Ohio Power Company, one with the Carolina Power & Light Company and the third with the Tennessee Eastern Power & Light Company. The Carolina contract was a 5-year contract from 1934, I believe, subject to automatic renewal from year to year. The Ohio Power Company contract was made some time in 1933 and goes on from year to year for no definite period, goes on from year to year automatically unless terminated by either group on proper notice. The Tennessee Eastern contract is a 5-year contract that went into effect, I believe, August 1, 1937, and provides for continuous renewal thereafter.

I wrote an article published in the Bulletin of the Edison Electric Institute under date of June, 1937, which contains the following:

"In 1927 the same Appalachian Electric Power Company made an interconnection with the Carolina Power & Light Company at Kingsport, Tennessee, and at the Virginia-North Carolina State Line, near Roxboro, North Carolina.

This materially strengthened both systems, permitted economy interchange between the two systems, one of which was predominantly hydro and the other steam, and for a period when faced with a shortage of capacity allowed the Appalachian Company to purchase firm capacity from the Carolina Company.


During the depression years a new arrangement involving no firm capacity was developed, which continues in force. This arrangement provided mutual back-up capacity, and made available large amounts of dump hydro for replacing steam generation on the Appalachian system."

[fol. 555] The facts stated in the quotation, so far as they go, are correct, but they are not all the facts. The testimony

which I have given here with regard to 25,000 kilowatts availability is a definite part of the agreement referred to in this article as the depression agreement. The statement that no firm capacity is involved in that agreement means that we are not obligated to take capacity regardless of whether we need it or not, but they are obligated to give it to us. We in turn are obligated to do other things for them in compensation for that. That involves the interchange of power from our system to theirs. It means it involves the obligation on our part to give them power in excess of what they give us on our peak, during our off-peak hours, to enable them to better coordinate their hydro facilities with our steam facilities.

When I speak of an automatic renewal of one of these contracts, I believe the terms are that either party can cancel the contract on one year's notice. I stated that in figuring our future capacity on my exhibits I have assumed that we will have the same capacity available from interconnections as exist now in 1937. About 8% of the total firm capacity of our companies which I have estimated for 1941 is represented by the capacity from the interconnection with companies that are not complainants in this case.

The figures on Complainants' Exhibit 367 showing a combined net peak demand for the three companies do not include any demand from interconnected companies. There would have to be added for varying years different amounts. Our experience has shown that that demand, as shown on these exhibits, would not change the figures as to our combined net peak demands, and I have not found that these demands have any material probability of occurring at the same time when we have our annual peak demand. It is [fol. 556] right that we have included in capacity the amount that we can get from the other companies interconnected with our system but have excluded the amount that we have to supply under the same contracts from our demand. And it is quite sound. For example, in the case of the Carolina Power & Light Company, we have no obligation to give them capacity except in off-peak periods, but their obligation to us is to give it to us on our peak. That is a very sound arrangement, incidentally. The arrangement with the Ohio Power Company, for example is not the same, but our experience in general has not been that the peaks occur at the same time. We are obligated to deliver power under



that contract. If it should happen that they would need capacity, then we would be obligated to help them over their peak. As to the Tennessee Eastern contract that is a very small amount that we are obligated to deliver, only 2,000 kilowatts.

It is not true that in order to sell power at the end of a transmission line as long as 250 miles, that line has either got to be very extra heavy duty type of line or else you have got to have generation at the terminal end of that line. You might have to have two circuits to supply dependable service, but that is entirely practical and feasible.

An article published by me in the *Electrical World*, under date of June 5, 1937, contains the following:

"In all of this, it ought to be pointed out that no long distance transmission of power is involved. Those who have closely studied the problem of transmission and thoroughly understand the economics of power supply, know that there is no sound economics in long-distance transmission of power. On the American Gas & Electric Company's system for example, the actual mean weighted distance of transmission under normal conditions in the nine states over which the system extends is less than 60 miles."

That statement is correct, but it has nothing to do with the feasibility of transmitting power say 250 miles. It [fol. 557] means it is not done on our system where economics are the guiding force, but it does not follow that every transmission is made with regard to economics.

Redirect examination:

The American Gas & Electric Company system is very definitely a steam system, and in the case of a steam system you have, of course, full control, or substantially that, and that is the way you locate your plants. If the system is developed properly, with proper regard to economics, the plants are located so as to provide for a minimum of transmission. That is what we have done. There is a totally different set of conditions, as to length of transmission, where you have a system that is wholly hydro. You develop the hydro where it is available and you transmit as far as you have to, and can go, or might be forced to go to find a market.

operating arrangement which is a firm obligation on their part to deliver to us firm power.

[fol. 572] "Judge Allen: . . . We are very much in hopes that the case can be concluded by Christmas time, that is, before we separate for Christmas, and we do think with the cooperation you have already shown and the further cooperation wherever possible, the Court hopes if it is possible, sometimes where it does not seem to be, that this case ought to be finished prior to Christmas.

Judge Martin: That schedule allows complainants four weeks in taking proof and defendants two. Speaking individually, I think that is quite adequate an allotment of time, and that the proof ought to be completed by the 23rd of December. Then I understand that you wanted time between the conclusion of proof and the presentation of proposed findings of fact and conclusions of law. But it does seem to me, speaking individually, six weeks full time for the presentation of proof is adequate.

Mr. R. T. Jackson: We will try to make it if we can. Of course, I have never found it possible to measure the proof merely by the calendar week.

Judge Allen: Well, it is the feeling of the whole bench that the case ought to be able to be completed within that time, bearing in mind as the Court has indicate before, that this bill is multifarious unless the plaintiffs fall into a common category. I think bearing that in mind that some of the proof is rather cumulative and ought to be either stipulated, or perhaps eliminated.

Mr. R. T. Jackson: I want, if the Court will permit me to say at this point, since the question of multifariousness has been mentioned from time to time, when and as it becomes material I want to strongly urge that any issue of fact which determines or bears upon the validity or constitutionality of these defendants' acts could not be multifarious, because whatever determines the validity or constitutionality of this utility, Federal utility, is something that would have to be considered even if each of the cases had been filed individually and the Court had been clogged with 18 separate suits.

Judge Allen: Of course, Mr. Jackson, very many of these acts do fall into a common category, and many of these circumstances, many of the situations fall into a common category. Is that not so?

Mr. R. T. Jackson: That is true. I am not going to argue the matter. I merely want to make the observation that there has been mentioned from time to time the matter of multifariousness.

[fol. 573] Judge Martin: If they do not fall into the common category, it would be multifarious.

Mr. R. T. Jackson: I am prepared to argue that at length and I have done that several times heretofore. I have not considered that issue to be involved since the Circuit Court of Appeals.

Judge Martin: Applying the decision of the Circuit Court of Appeals which I am attempting to do, I think you must be in the same boat with all the complainants, otherwise you would be in a multifarious situation, if I rightly read the opinion.

Mr. R. T. Jackson: I think the most important question in this case is the validity of the Tennessee Valley Authority Act. That is common to every plaintiff, and that is the point I make, anything that bears on that cannot be multifarious.

Judge Allen: Proceed."

Cross-examination continued:

In discussing the South Carolina contract, I said 4,000 kilowatts. I have not got a copy of that contract here, but I think it was executed somewhere about January 1, 1937. The demand figures that I have shown on this chart are the demands incidental to the territorial supply, the firm supply of our customers in the area in which we serve, and do not include the demands which might be reflected by reason of interconnections which are on a when and if available basis. We are not under an obligation to deliver power in return for power we receive from the Florida Power Corporation or the South Carolina Gas & Electric Company.

With respect to the balance of the 50,000 kilowatts, we have made a further and another arrangement with the South Carolina Electric & Gas Company whereby the surplus energy that is available upon our system in quantities during the early part of the year may be moved into the Saluda reservoir on their system and stored. The increase which becomes available to the South Carolina Electric & [fol. 574] Gas Company by reason of the movement of this energy is made available to us in the Fall of the year should we require it. That is firm energy. As long as we are able

In hydro practically all of the costs are fixed, and once you have developed a hydro plant, you literally have a terrific pressure exerted on you to find a market and you can go much further and yet after paying for the cost of transmission, be better off than you would be if you did not go to find that market but allowed the power to go to waste. But that don't mean that that long distance that you go is necessarily economical.

(The witness was excused.)

[fol. 558] WALTER M. ROBINSON was called as a witness on behalf of the complainants and, having been first duly sworn, was examined and testified as follows:

Direct examination:

I am 43 years old, reside in Nashville and am in the investment business, the senior partner in the firm of Robinson, Webster and Gibson. The partnership is engaged in the general distribution of investment securities, underwriters of small industrial and corporate issues and municipal bonds, and is a member of practically all of the national distributing syndicates. I have been in the investment security business in Nashville since 1920, 17 years. We were a party to most of the underwriting syndicates for the distribution of the issues which are underwritten and distributed nationally. Last year about 40% of our volume was in public utility securities. We handle or deal particularly in securities that might be called local or quasi local-securities; that is, securities of The Tennessee Electric Power Company, Nashville Gas & Heating Company, Nashville and Decatur Railroad and other local issues. It has been a part of my business to keep myself informed about the conditions of the companies whose securities we were handling and about the markets and financial conditions generally.

"Q. How have you done that, to what extent?

Mr. O'Brian: If the Court please it is apparent that this testimony, from the questions already elicited, is in some way directed to some question of damage in this case. I desire to object at this time to any evidence being offered as to security values through an expert witness. It is obvious

that with the number of complainants that we have in this case there can be no similarity or basic similarity among them, and it is also evident that facts of this character going to damage would be speculative, it would be a matter of opinion, they would be remote in application, and would be irrelevant and immaterial in this case. It is proof [fol. 559] offered through an expert witness testifying as to the market values. It is offered as not direct evidence, but indirect evidence of actual value and actual damage to any particular complainant as distinguished from damage to the owner of a stock in that company. The value of a stock is not a matter of damage, an element of damage to a corporation. It may be an element of damage under certain circumstances to the owner of the stock. Therefore, for all of these reasons we object to evidence of this character being offered as irrelevant and immaterial and remote and speculative, and not the proper form of evidence on which to predicate damage.

Judge Allen: Just what do you expect to prove by this witness?

Mr. Trabue: Why I expect to prove, may it please your honors, that the investment quality of the Tennessee Electric Power Company bonds, judged by its statistical record, is good, and that by reason of this good statistical record, and judged by that alone, it would be able to refinance its outstanding bonds which are now at 5 and 6 per cent, for say $3\frac{3}{4}$ per cent, and save for that company something like \$800,000 a year. And that in consequence of the TVA competition, and threat of competition, it is unable to refinance its bonds.

Mr. O'Brian: May it please the Court, taking this statement as an offer of proof, it is perfectly evident a matter of common knowledge of which the Court will take cognizance, that the elements affecting the security values are very numerous, that a vast number of questions have to be weighed in determining whether a quotation, for example, this morning, is any proper reflection of the value of the security—a study of the existing money market, the study of the conditions, the desire of a holder to sell, the question of whether banks are holding stocks as collateral and attempt suddenly to liquidate them. There are a thousand elements of which the Court as a matter of common knowledge may

be aware, affect the value of securities. Certainly under these circumstances evidence of the opinion of a witness as to the precise degree of effect which a competitor's activities may have upon the value of the security cannot be competent or relevant evidence. On these grounds, we object to its reception.

Mr. Trabue: May it please your Honor, the only objection I had at all anticipated would be to this, would be on account of your Honor's suggestion a little while ago that the Court would take judicial cognizance of the fact that competition would injure and damage the business and the property of the other competitor. Now, one form of injury, may it please your Honors, is to so prejudice its securities, issued at a high interest rate, that it cannot get the benefit that some other companies in similar situations are getting by [fol. 560] reason of the low money market, and save \$800,000 a year for the company, not the stockholders.

Judge Allen: On the statement of counsel, the Court considers that the evidence proffered is irrelevant and immaterial. It will be excluded and you may have your exception. The statement will be taken as the offer of proof.

Mr. Trabue: May I make one further offer in a little bit more considered language, which I will do right now if your Honor will permit.

Judge Allen: You may, but submit it to the Court—or if you want—

Mr. Trabue: It was intended to be shown and proven by this witness that upon the statistical record of the Tennessee Electric Power Company, its bonds are all a good investment quality, and the company would be able to refund them from their present 5 and 6 per cent rates to a lower rate of say, $3\frac{3}{4}$ per cent, and save some \$800,000 annually to the company, but that in consequence of the competition of the Tennessee Valley Authority and the threat of competition by the Tennessee Valley Authority, its 5 and 6 per cent bonds average the very low value of 85, and it cannot refinance at lower rates.

Judge Allen: I might say the Court has assumed the existence of damages from the presence of such competition as is shown by this record. To go into such facts as are offered and to examine into the various factors which might bear upon and perhaps cooperate in causing the fall in value of the security, in the judgment of the Court, would

lead us into endless ramifications, which certainly is totally unnecessary for the plaintiffs, in view of the assumptions made by the Court."

(The witness was excused.)

G. H. MIDDLEMISS was called as a witness on behalf of the complainants and, having been first duly sworn, was examined and testified as follows:

Direct examination:

My occupation is Manager of Production & Transmission for The Commonwealth & Southern Corporation of New York. My residence is in Birmingham, Alabama and that is my headquarters. My duties with The Commonwealth & [fol. 561] Southern Corporation of New York involve the coordination of the generating facilities for the maximum capabilities and the lowest cost of generation for the entire system of the Commonwealth & Southern in the South. Of course, continual studies are required in this matter and aside from these duties I undertake special work with problems in connection with operations and economics.

I graduated from the University of California in 1910 with the degree of electrical engineer and entered the employ of the Pacific Gas & Electric Company at Sacramento, California, where extensive underground construction was in progress. I became responsible for design and construction activities and later undertook duties in connection with the rehabilitation of the overhead distribution systems. In 1917 I entered the employ of the Alabama Power Company with headquarters in Birmingham, as Superintendent of Maintenance, having the responsibility for the operation and maintenance of all transmission and distribution facilities from the switchboards of the generating plants to the ultimate consumers. The Company was expanding rapidly in that time and I became involved in certain phases of construction. In about 1928 I became Vice President of the Southeastern Engineering Company, a service company for the Southeastern Power & Light Company, which was the predecessor of The Commonwealth & Southern Corporation to these properties. My position caused me to contact all companies of the South in that group and to assist in a

supervisory capacity with relation to operations of electric, water, gas, ice, transportation properties and so on. During all this period I was in close touch with the construction activities and with the power plants and became familiar with the coordination of those units for the maximum output. In 1930 when The Commonwealth & Southern Corp. [fol. 562] ration assumed sponsorship, I was assigned the position I now hold.

There are six operating companies which comprise the integrated system of the Commonwealth & Southern system of the South—the Alabama, Georgia, Tennessee, South Carolina, Gulf and Mississippi Power Companies. There is a transmission grid composed of 9,581 miles of circuit serving 1,877 communities. Over 562,000 customers directly and over 150,000 customers indirectly were being supplied from this network in August, 1937. The system serves an area which covers about 150,000 square miles of territory.

The table (offered and received in evidence as Complainants' Exhibit 371) entitled, "Summary of Capacities Available to Commonwealth & Southern System 1937, Southern System", shows the capacities of the integrated system by types and by companies. There is a total of 1,397,940 kilowatts of capacities, consisting of 43 hydro sources and 95 steam sources, about 98 per cent of the total capacities serving the entire interconnected transmission network. All of these resources are integrated in operation as one source of power supply. It shows steam and hydro plants by divisions and by companies. (The data with respect to the Georgia Power Company was limited by counsel's statement that it was offered not as any proof of any property rights or interest of the Georgia Power Company but solely for the purpose of showing the adequacy of the complainant companies in the Commonwealth and Southern group, the capacity of which group is integrated.)

About 65 per cent of the total capacities of this system are in hydro plants located principally in Alabama, Georgia and Tennessee. On the Coosa River there is 262,000 kilowatts of installed capacity in the run-of-river type of plants which requires generation of the flows as they pass the structures, [fol. 563] there being very little storage. At these particular plants 30 per cent of our total average yearly hydro generation is produced. There are 9 plants on the Chattahoochee River with 100,000 kilowatts installed. In Tennes-

see there is the Hales Bar Plant and throughout East Tennessee and Georgia there are 16 smaller capacities. As to the storage type of plant where the water is retained for use later in the year or when the flows of our run-of-river plants are low, we have 563,000 kilowatts of capacity connected with seven large storage reservoirs. There are 17 plants altogether and the amount of energy stored alone is 524,000,000 kilowatt-hours.

There is an aggregate of 314,500 kilowatts of capacity in large steam plants located in the coal fields of Alabama on the Warrior River and in Tennessee near the source of low cost fuels of Kentucky. These plants are used for the greatest period of time in carrying our loads and to supplement hydro generation. We have 123,000 kilowatts of so-called secondary sources which are required to operate fully in the extreme low flow years, but only to a very limited extent in other years. They are not in regular service but occasional service every year to take care of line maintenance and outages. These plants are not required to operate except in the extreme low flow years, for occasional line outages, for maintenance of lines, and to some very limited extent when the flows are somewhat below normal. The power sources supplying this integrated transmission system are operated as though all companies were a single company. There is a central agency which specifies the loading upon the plants for maximum utilization of the waters that are available and directs the bringing on of steam capacities to supplement hydro generation. The plants that are of the [fol. 564] least operating cost are brought into service first.

The function of the transmission network is to provide for complete integration of the generating capacities and to serve load centers. The transmission network permits the full freedom of operation of the plants and is designed for this purpose. There are 133,000 kilowatts of tie line capacities between the transmission network of the Commonwealth & Southern system and the integrated transmission network extending from Florida up through Pennsylvania and into Chicago. Practically all of our large load centers are supplied by duplicate lines. When the construction of the second circuit to Mobile is completed in the early part of 1938, all of our large centers will be supplied by duplicate circuits. The important interconnections involving this 133,000 kilowatts of tie line capacity include the

Carolina Power & Light Company, Florida Power Corporation, the South Carolina Electric & Gas Company, the Duke Power Company and the Aluminum Company of America. These interconnections are closed practically all of the time. When surplus energy exists upon one system and is useful upon some other system, negotiations are made at the time for particular quantities and its delivery.

We have definite contracts with the Carolina Power & Light Company, the South Carolina Electric & Gas Company and the Florida Power Corporation. Capacities are available to us for regular or emergency use. I am satisfied that all together we have available to our system from interconnections 50,000 or more kilowatts capacity should we require it.

Examination by the Court:

The Commonwealth & Southern Corporation of New York [fol. 565] is a service corporation supplying advisory service as to operating and management policies. It does not own the stock of the Georgia Power Company. Each operating company owns stock of the service company. I do not know how many shares of stock the Georgia Power Company owns. All the facilities of the Georgia Power Company that I have shown on this chart are operated as a part of the entire interconnected system. It arises through the dispatching and daily contact with this central agency that I have described. I don't know who owns the stock of the Georgia Power Company.

(Counsel for complainants' then read the following statement setting forth the relationship between these companies):

"(1) Commonwealth & Southern Corporation (of Delaware) is a corporation organized in 1929 under the laws of the State of Delaware. It owns all of the common stock of a number of operating companies, including: Alabama Power Company, Southern Tennessee Power Company, Mississippi Power Company, Gulf Power Company, Georgia Power Company, South Carolina Power Company, and over 99 per cent of the common stock of the Tennessee Electric Power Company. It also owns bonds and preferred stock of these companies.

"(2) The Commonwealth & Southern Corporation (of New York) is a corporation organized under the laws of the

State of New York in 1930. It has 4,500 shares of capital stock of \$100 par value. This capital stock is owned by fourteen operating subsidiaries of The Commonwealth & Southern Corporation of Delaware as follows: The Tennessee Electric Power Company, Georgia Power Company, Mississippi Power Company, Alabama Power Company, Gulf Power Company, South Carolina Power Company, Southern Indiana Gas & Electric Company, Central Illinois Light Company, Ohio-Edison Company, Consumers Power Company, Pennsylvania Power Company, and Akron Transportation Company, Penn-Ohio Coach Lines Company, and the Youngstown Municipal Railway Company. The amount of common stock of Commonwealth & Southern Corporation of New York owned by each of the foregoing companies is the proportion that the gross operating revenue of each company bears to the total gross operating revenue of such fourteen companies. The Commonwealth & Southern Corporation of New York is therefore a mutual service company acting in matters common to these companies such as operation, finance, accounting, purchasing, engineering and other matters."

Direct examination continued:

We made a recent study to determine the load carrying ability of the generating system. We made a recent survey of all of our smaller steam generating capacities. We used operating records of those plants that are regularly operated in our loads. During the past 40 years of record, we have experienced 3 years of extreme low flows wherein our stream capacity was restricted to practically the same degree. 1931 was one of those years where we had at that time all of our present hydro capacities in existence, and accordingly we had full experience in operations in that type of year. We gave due consideration to reduced capacities, because of low flows and other factors involved in the operation and maintenance of the system. We provided adequate reserves based on our experience and our day to day knowledge of the operation of the plants. We also gave consideration to questions involving the adequate supply of power to our customers, at the same time having power ready for the growth of load. On the other hand, it was necessary to give consideration to avoidance of undue surplusages of capacity which would ultimately result in increased burdens upon our

system, financial burdens, and less reduction of cost to customers, as the years go on. The capacity of the coordinated system in the load such as we have in 1937 is 919,000 kilowatts.

The difference between this figure of 919,000 kilowatts and the figure 1,397,940 kilowatts appearing in the last column on Complainants' Exhibit 371, opposite the legend reading [fol. 567] "Total Maximum Capacities", is that the figure of 919,000 kilowatts is the firm capacity of our system after making allowances for reduced flows, flow regulations required because of navigation, reduced hydro capabilities, reservoir reserves, and in addition, an assumption of the loss of a large unit during the most critical period of stream flow. These omissions account for the difference between the figures mentioned.

In 1936 the transmission network of the coordinated system carried 4,553,000,000 kilowatt-hours and a demand of 880,570 kilowatts. The forecasts of loads that we have made for this year and for subsequent years are predicated upon a continuation of service to our existing areas and customers now supplied. Forecasts are somewhat speculative, but the forecasts that we have made exceed the average trend experienced over the past 25 years, and we feel that they are the maximum loads that we will be required to supply. The figures for 1938 are 5,195,000,000 kilowatt-hours and 945,000 kilowatts. Those figures are in excess of the load estimates or of the actual loads that we expect to have in 1937 by about 361,000,000 kilowatt-hours. However, our loads in 1937, at this time, are showing a downward trend, and we have reflected that in these estimates. In making these estimates we assumed the Company's continuing service to the customers now supplied in the same service area. However, we assumed that there would be a normal growth of load, and of customers also, based upon our past experience.

The estimates are based upon a contact with our field representatives and Commercial Department and Power Sales Divisions which are continually in contact with customers and are apprised from time to time of the industrial outlook. [fol. 568] We have a running record of the classification of sales. We have considered in 1938 and 1939 a continuation of the residential and commercial trends of growth that have been experienced in recent years. However, in respect to industries, the problem cannot be approached from that

standpoint. We have given consideration to the extent of recovery indicated in a particular industry or group of industries and the outlook as we obtained it in reference to future manufacture. All of these considerations provide a basis for the estimates of 1937, 1938 and 1939. Our loads in 1937, however, for the past several weeks, have shown a pronounced dip. In our estimates we did not allow for the continuance of that dip but for the resumption of the upward trends.

The maximum demands that we have experienced in 1937 so far are 891,700 kilowatts, and we anticipate that this is the maximum for the year. The capacity of our system is 919,000 kilowatts and the surplus is 27,300 kilowatts. Frankly, I believe that in view of the reserves that we have considered, our actual surpluses are in excess of 60,000 or 80,000 kilowatts.

These companies have taken steps to add capacity in 1938 and 1939. A 25,000 kilowatt steam turbo unit has been ordered and is now completed for installation at Nashville. Regulatory commissions in Tennessee and Georgia have approved this construction.

"Mr. Fly: May I ask Mr. Middlemiss are all these generating plants on the same interconnected system?"

The Witness: All of them.

Mr. Fly: And can you cut in all of those generating plants on to the system without further substantial expense?"

The Witness: They are all operating and interconnected to this transmission grid at the present time.

Mr. Fly: And there would be no problem of expense of cutting any one of them into that pool?"

The Witness: They are already in the pool."

[fol. 568a] Two 40,000 kilowatt units are now on order, one for delivery in May 1938 and the other in June 1938. It is proposed to install this equipment at the Atkinson Steam Plant near Atlanta, Georgia. Aside from these capacities which will be available for installation, I am satisfied that we can obtain 50,000 kilowatts of additional capacity from our interconnections. We could carry our [fol. 569] 1938 projected loads with the surplus of capacity that exists in 1937 and the use of the 50,000 kilowatts available from interconnections, but we are not counting upon that. We hope and expect to receive governmental approval

for the installation of the equipment at Nashville: and the new 105,000 kilowatts of capacity, plus the 50,000 kilowatts that will be available to us from interconnections, should provide a total of 155,000 kilowatts available in the next two years, beyond the 1937 capacity. In my opinion, that capacity will be available for the loads to be anticipated during those years. Our anticipated growth of load through 1939 is about 93,000 kilowatts. We have 155,000 kilowatts of additional capacity in sight. All together we would have then a surplus of 60,000 kilowatts on our system. There has not been any power shortage on our system in previous years. Our capacities have always been increased in advance of market demands or otherwise. They have always been increased. There has always been a surplus.

The graph (offered and received in evidence as Complainants' Exhibit 372) shows by the line at the top of the sheet the installed capacities of the interconnected system from 1929 through 1937, and as contemplated in 1938 and 1939. The line at the top of the shaded area is the firm capacity of the system for each year through 1937 and as suggested in 1938 and 1939. The lower line, or at the bottom of the shaded area, is the loads upon the interconnected system set forth in the same manner that the capacities have been shown; that is, they are actual up to October 1937 and estimated thereafter. The shaded area indicates the amount of firm capacity surplus that we have experienced each year in this territory. These curves as they relate to past years [fol. 570] are correct representations of the company experience as to load and capacity. The curves on the graph for the years 1938 and 1939 and the balance of 1937 represent our opinion as to the adequacy or what will be the adequacy of the facilities of this system. As shown on this graph the greatest surplus existed in 1933. The figure totals 279,000 kilowatts. There has never been a shortage of power on our system.

Cross-examination:

In answer to the question as to whether considerable additions to capacity are not contemplated in 1938, according to Exhibit 372, I testified that in 1938 we would have ample capacity to carry our respective loads, if we installed the 25,000 unit at Nashville and obtained 50,000 kilowatts from interconnections. There would be only then an increase of 25,000 kilowatts of installed capacity on our system. Re-

ferring to the fact that the firm capacity line on the graph shows an addition by the end of 1939 of about 150,000 kilowatts, I would not say that that was a necessary indication that this was in my opinion a necessary addition of capacity. In planning our capacity installations, decisions are made as to the actual construction of plants and additions to them when it is required. It is speculative as to what is going to happen in 1939. The exhibit is intended to show that we are prepared to add 150,000 kilowatts to our capacities in 1939 if we need to add them.

I said 361,000,000 kilowatt-hours was the estimated increase in loads of 1937 over 1936. The estimate for 1938 over 1937 was 281,000,000 kilowatt-hours. For the three years, 1934, 1935, and 1936, the increase was approximately 1,311,000,000 kilowatt-hours. That represents an increase [fol. 571] of over 40 per cent over the 1933 figure. However, you must take into consideration the fact that 1933 was at the depth of the depression and we were experiencing a recovery of industrial operations upon the same or practically the same plants that existed prior to or at the end of 1929. In other words, there had been very little expansion of industries in our territory and this increase was a development or return to higher production upon that capacity. Even if we take the years 1930 to 1937, our average annual increase I believe is about 5 per cent. In the three years from 1937, which includes the effect at the present time or shows the effect of the recession on that curve through 1939, these estimates are slightly in excess of 6 per cent average annual increase—a little bit more than 6 per cent.

I said our surplus generating capacity in 1937 was 27,300 kilowatts. In that figure I have provided reserves which there is a remote possibility of their utilization. I took no power from interconnections which are available to us. I think with the back-up of interconnections and the probability of not having to use these reserves, that there are 60,000 to 80,000 kilowatts of surplus on our system. With respect to the 50,000 kilowatts of capacity from interconnections, we have under firm contract 15,000 kilowatts from the Florida Power Corporation. That is available to us at any time. I mean that they are under a contractual obligation to deliver us 15,000 kilowatts of firm power. That contract is dated October 20, 1937, and is for a term of 3 years. We also have a contract for 4,000 kilowatts with the South Carolina Electric & Gas Company. We have an

to put that energy into the Saluda reservoir, we have 10,000 kilowatts available to us when we need it. That is not in the form of a contract. It is not my understanding it is yet in the form of a contract, but it is actually in operation. I do not know what the terms of the arrangement are or the length of the term, nor do I know what they will be.

With respect to the rest of the 50,000 kilowatts, there is a surplus of capacity upon the Duke Power Company's system. They have recently installed, and it will be completed in the Spring of 1938, according to my understanding, an additional unit at the River Bend plant. Our executives have been in contact with the Duke Power Company and we are advised we can have the power surplus as available on their system. We have no contract with them. That is not the balance that we counted on to make up the 50,000 kilowatts. There are capacities available from all of the companies that are interconnected to our transmission network in varying degrees. I have mentioned a part that is under contract. The 10,000 kilowatts of the South Carolina Electric & Gas Company should be available to us. It is just a question of using the equipment that is all.

The figure of 919,000 kilowatts is our figure of firm capacity after we have given due consideration to a number of reserves which in our opinion are likely to be called upon very seldom. That figure varies from the figure our system reported to the Federal Power Commission in 1934. We reported to the Federal Power Commission in 1934, 904,000 [fol. 575] kilowatts. Since that report we have added the 4,000 kilowatts from the South Carolina Electric & Gas Company. We have extended the transmission network to include other capacities that were not then connected. We have made improvements in varying degrees in our plant facilities. Also in our larger loads, we are able to attain a greater utilization of hydro resources, and the result of all of this gives us the increase from 904,000 kilowatts to 919,000 kilowatts.

There are no major generating plants now under construction. There may be some minor additions at various plants now in process of construction. Except for a few very small plants, I believe we are adding an oil engine or two down in some of our isolated districts, but outside of that we are installing no larger capacities. However, plans are being made for developments at Nashville and Atkinson. And we have given considerable preliminary

study to the addition of capacities elsewhere on our system, but no actual construction work has begun.

In my calculations there was 60,000 kilowatts of firm capacity reserved over demand. We assumed a possible loss of one of our largest steam plants at a particular time in a particular dry year, three of which occurred in forty years of record, and during that dry year our loads would likewise have to be maximum, of course, for the loss of that unit to cripple us in any respect. That is not the only allowance. We have in our reservoirs a reserve which at the end of the dry season is equivalent as energy to the operation of a 60,000 kilowatt unit for nearly two months. We have not loaded our steam facilities up to their maximum capacities. The average loading we have assumed in this study is 20,000 kilowatts below the capabilities of these steam units. We also have an overload capacity which we [fol. 576] think perfectly proper to allow for reserve in case of extreme emergencies.

Referring to the 33,820 kilowatts in twenty customers' plants, included in our installed capacity on Exhibit 371, many of those plants are in actual operation, and particularly at locations where process steam is required, generation is also secured from that process steam, and we supply a part of the load and the manufacturer supplies the remainder. At many of the plants the boilers are fired regularly and used regularly for process steam. Others of the plants are not operated except in emergency, long outage or something of that sort. When I say many of these plants have been operated, what I mean is that they have been operated for that particular customer's own use, because we require these plants very, very seldom. As a matter of fact, we only contemplate using them in extreme dry years which occurred three times in forty years of record. I do not know how many of those twenty plants have been operated to supply energy to meet our demand. I have no data on that with me.

The 17,500 kilowatts of power, shown on Complainants' Exhibit 371, as purchased by the Alabama Power Company, consists of 15,000 kilowatts available to us from the Tennessee Coal, Iron & R. R. Company from a large steam plant located on the outskirts of Birmingham and 2,500 kilowatts available to us from the Sloss-Sheffield Company, a by-product concern located in Birmingham. The four

sources shown on that table mean that for the entire line of all of the companies there are four sources of power. I have not included any of the power purchased or obtained from the TVA.

(The witness was excused.)

[fol. 577] ALBERT S. CRANE was called as a witness on behalf of the complainants and, having been first duly sworn, was examined and testified as follows:

Direct examination:

I reside at 32 West 40th Street, New York, and am a consulting hydraulic engineer. I had my primary education in the schools of Addison, New York, and in 1891, I was graduated from Cornell University with the degree of Civil Engineer. Upon graduation, I went to Europe with a prominent engineer to study sewer construction and inspect plants there. Upon return, I went to the city of Newton and was engaged in the design and construction of sewers for four years. I then went to Washington and was in the United States Engineer office on the design of sewers and sewage disposal for Old Point Comfort. I then went to Brooklyn in the department of city works and I was on the sewer design until October, 1898. I then went to Sault Ste. Marie, Michigan, as principal assistant engineer on the construction of a hydro-electric plant of about 30,000 horsepower capacity. In 1902, I went to Sault Ste. Marie, Ontario, as chief engineer of the Lake Superior Power Company, where I also had charge of the operation of a 14,000 horsepower hydro plant. I then went to Chicago as principal assistant engineer on the Chicago Drainage Canal. While I was there, I had charge of the extension of the main canal from Lockport to Joliet and of the design of the hydro-electric plant at Lockport. Then in 1905, I went to New York as hydraulic engineer of J. G. White & Company. On January 1, 1913, I became vice president in charge of construction of J. G. White Engineering Corporation. I resigned in September, 1928, and went into business for myself as consulting engineer. I have been engaged in the [fol. 578] design of dams and hydro-electric plants since 1898—39 years. Some of the larger dams and hydro-electric developments which I designed are as follows:

	State	Horse-power
Michigan Lake Superior Power Co.	Michigan	30,000
Sanitary District of Chicago	Illinois	30,000
West Buxton	Maine	6,000
Comerio	Puerto Rico ..	8,000
Bonny Eagle	Maine	15,000
Vernon	Vermont	26,000
Ocmulgee	Georgia	15,000
LaCrosse	Wisconsin	25,000
Canadian Light	Quebec	30,000
Stevens Creek	Georgia	15,000
Parr Shoals	So. Carolina ..	18,000
San Joaquin	California	10,000
Glenwood	Colorado	10,000
Boulder	Colorado	10,000
Soda Springs	Idaho	12,000
Cove	Idaho	12,000
Grace	Utah	20,000
Oneida	Utah	20,000
Deerfield No. 2	Massachusetts ..	8,000
Deerfield No. 3	"	8,000
Deerfield No. 4	"	8,000
Deerfield No. 5	"	12,000
Parksville	Tennessee	22,000
Ocoee No. 2	Tennessee	30,000
Caney Forks	Tennessee	20,000
Big Sandy	Oregon	10,000
Oak Grove	Oregon	40,000
Dashville	New York	10,000
Sturgeon Pool	New York	20,000
Davis Bridge	Vermont	60,000
Bellows Falls	Vermont	60,000
McIndoes	New Hampshire ..	15,000
Comerford	New Hampshire ..	210,000
Saluda Dam	So. Carolina ..	220,000
Osage Foundations	Missouri	201,000
Beauharnois	Ontario	450,000
Canyon	Ontario	132,000
Salto del Duero	Spain	200,000

I have also had charge of the design or been consulting engineer on between 20 and 30 larger dams and have been connected with three large irrigation projects, one in Idaho, one in Don Martene, Mexico, and one at Agua Caliente, Mexico; also consulting engineer for the Sacandaga, New [fol. 579] York, Flood Control District in the building of the Sacandaga Dam. At present, I am consulting engineer on the Mahookey Flood Control project in New York State where we are building three large dams; also on the Board of Consulting Engineers on the Southern New York Flood Control District.

I am a member of the following technical or professional societies; The American Society of Engineers; the American Institute of Electrical Engineers; the Western Society of Engineers, and the Boston Society of Civil Engineers.

I have done engineering work for electrical utilities companies on the Tennessee River and its tributaries. Beginning twenty-two years ago, I was in charge of the designing of the Ocoee, Parksville, dam and station, and Ocoee No. 2, which is just above it. I did quite a little work on the rehabilitation of the Hales Bar turbine units. I had charge of the design of the Rock Island plant on the Caney Forks River. I also made a number of investigations on the main river and tributaries.

A little over a year ago, I made a trip over the Tennessee River and visited all of the TVA sites, except Gilbertsville. I also went to Norris and I already had been at Fowler's Bend on the Hiwassee.

I have examined the report of the TVA to Congress setting forth the so-called Unified Plan of the TVA transmitted under date of March 31, 1936, Complainants' Exhibit 328 in this case. Wilson Dam and Hales Bar Dam were in existence on the Tennessee River in May, 1933. There were also substantial hydro-electric developments on the tributaries at that time. On the Ocoee, there was Parksville and Ocoee No. 2 and on the Little Tennessee, there was Santeetlah, Cheoah and Calderwood. I forget the [fol. 580] name of the other on the Pigeon.

Assuming that the primary purpose was to develop the Tennessee River for power purposes, it could best be achieved by constructing a small number of high dams. In the first place, a small number of high dams would be less subject to fluctuation of head. For instance, if they were

all low dams, at very high water there would be no head at all. With high dams, it is not so. Then, the ponds created by high dams are of great use particularly for the storage and partly for pondage to carry over the water for the week-end; also to turn the power into a form that is most useful. In other words, perhaps all of the power might be developed in eight hours instead of twenty-four hours.

The characteristics of commercial power are, first of all, that it must meet the demands of the customer as to time and quantity. It also must meet seasonal fluctuations. In other words, it must be there at all times whenever the customer wants it. Commercial power would best be developed on the Tennessee River by a system of high dams with large ponds.

Assuming that under conditions existing in May, 1933, I had been commissioned to design and plan for the development of the Tennessee River and its tributaries, so as to produce rapidly a large amount of continuous firm power on the order of 600,000 to 700,000 kilowatts, suitable for use in a utility system, disregarding the economics of its production and subject only to the limitation that there should incidentally be provided a nine-foot channel for navigation on the Tennessee River from its mouth at Paducah to its source at Knoxville, at that time I would have turned to House Document 328 and selected as therein shown Aurora Landing, Pickwick, Wilson (already developed), Wheeler, Guntersville, Chickamauga, White River and Coulter Shoals. [fol. 581] And then I would have continued investigations, more detailed investigations, and I probably would have arrived at the change of the lower one to Gilbertsville and White River to Watts Bar. Those changes would have come about due to, for instance at Aurora Landing, the lower one, the foundations were bad, and they found a better place to locate them. The same holds more or less true of the White River location.

On the tributaries, I would select—I already had made investigations on the Cove Creek years ago and I would select that and probably move it to the present site of Norris. I also had investigated the Powellson site on the Hiwassee and that now has become Fowler's Bend. I had a general understanding of the conditions at Fontana, but I never was there, but from the report, I would have taken

it, because it was such a large reservoir and high dam where you could get a lot of storage and at times you could get a lot of power.

The storage from the standpoint of power in this whole proposition is of very great importance, because the natural low water flow, say at Wilson, is merely something like 4,000 second feet. After you develop these others, Norris, why it would be over three times that, 3.2 times that. After you got Fontana in, it would be about 3.9 times that. And after Fowler's Bend, it would be over four times what it was originally, so that shows the great importance of storage.

As a result of my examination, in my opinion the projects and design of the TVA as set forth in its report to Congress, under date of March 31, 1936, is primarily a power development. My reasons are: first, that the dam sites and dams as arranged are just as anyone would make if they [fol. 582] were developing for power and had no thought of anything else. And then, at each dam, there is a large capacity for machinery installed, and also at each dam, there is a large pond which enables one to convert the 24 hour flow into 8 hour power or any desired flow. And then, the cost of the whole project as given in these reports is very much greater than the sum of the cost for navigation alone, as has been testified here, plus the cost of making a flood control project. These all indicate that its main purpose is power. If it is to be made as a yardstick for power, that would have a lot to do with it. It has been said this was a yardstick for power. I have already commented on the significance of storage.

Cross-examination:

I was retained as a witness in this case in November 1936. I had been more or less familiar with this river for twenty years or more. My first study after I was retained as a witness was in November, 1936. That was the time last year when I went up the river as I described it. That was not in the outboard motor boat that Mr. Kurtz went in. Mr. Yates asked me if I would help in this TVA lawsuit. I then said "Why, I will, but the first thing I want to do, I want to go down and see all of these plants". I had been familiar with Hales Bar and Hiwassee sites and the other places that I mentioned before that.

I said that if I were commissioned in 1933 to build a project primarily for power, I would take the plan of the Army Engineers for the high dams to start with. With the exception of Aurora, these dams that have been erected and are under construction and are recommended for construction in the Unified Plan are all of them located either exactly on the site recommended by the Army Engineers or near [fol. 583] to the respective sites. White Creek is a little different, but not very much. Gunter'sville is also a little different. But otherwise, these dams that have been built have been built substantially on the sites recommended by the Corps of Engineers prior to the creation of the TVA. That is also true of the Cove Creek Dam. I was familiar with Cove Creek some years back. I think that dam was discussed by the Army Engineers prior to 1930, their House report. I investigated it before that. That site too was recommended by the Army Engineers.

I spoke of the difficulty of locating Gilbertsville. I understand that the site approximately selected by the Army Engineers proved to be unsatisfactory because of bad foundations at Aurora and that it took several years of study and borings before the TVA engineers found a site at Gilbertsville, which they believed to be satisfactory, so that the location of that site was delayed by natural conditions, so to speak.

Next to Wilson Dam, I know that one of the worst spots on the river for navigation above or below Wilson Dam was where the Wheeler Dam has been located, but I am not very familiar with the navigation feature. I said I was familiar with the river for some years back but more from a power standpoint than navigation. Next to Wilson Dam, the Wheeler dam site was known as the steepest spot on the river. I understand that before TVA was created, the Army Engineers had decided on building a dam on the site of Wheeler Dam and had already commenced the building of the lock.

I believe that it is a fact also that next to Wilson and Wheeler, the next worst spot on the river was above Colbert Shoals where Pickwick Dam is located, and that the Army Engineers had tentatively selected that site for a lock. I don't know whether they selected a lock. They selected it as one of the places for a dam.

[fol. 584] "Q. Referring to the Gilbertsville site named in the unified plan, is it not a fact that the dam, if located at that site, instead of at Aurora, as originally considered by the Army, will result, if the dam is erected, in a very much larger facility for flood control than if it had been located at Aurora, assuming the dams to be the same height?

A. Yes, the pond would be longer.

Q. The Gilbertsville site is much better for flood control than Aurora, that is what I am trying to get at?

A. Yes.

Q. That is a fact, isn't it?

A. Yes, that is a fact."

I spoke of the Sacandaga reservoir on which I was consulting engineer. That is a reservoir in the upper reaches of the Hudson River above Albany. I had a lot to do with its design as consulting engineer. That is a flood control project. It is fundamentally a river regulating project. It is not a detention basin or a retarding basin. It is a multiple purpose dam. That is to say, its function is to provide flood control and to provide water for regulation of the Hudson River below the dam in low water season and also to develop power. The Sacandaga reservoir accomplishes three separate functions and is a so-called controlled reservoir. It is constantly under the care and immediate control of the Water Regulating District. To some extent it is a seasonal operation. It does not generate power all the time. In actual operation, the Sacandaga reservoir is operated successfully for the control of floods, including the greatest of record in that area. The dam, although it is equipped with power facilities, is operated with remarkable success in the control of floods, but power is a purely secondary thing—that is, a by-product. I don't know that that is just as it is in your dams. There are months when there is no power developed at Sacandaga. Low water regulation [fol. 585] is the main thing. The rule is that we shall regulate the flow of the Hudson River at Spier Falls to 3,000 feet per second, in other words, sometimes it gets down to 200, but we always keep it up to 3,000 and everything else is subject to that.

"Q. But if it was not for your standing by that rule you could use the dam pretty much all the year round for power, couldn't you, that dam?

A. Oh, yes.

Q. That is depending upon the integrity of its operation?

A. Yes.

Q. It could be used for power or it could be used for flood control?

A. Yes.

Q. That is fair, isn't it, a fair statement?

A. Physically, yes."

When I said that I based my opinion in part upon the fact that the cost of the whole TVA Plan was greater than the sum of the cost for navigation, or as testified here, the making of a flood control project, I was not referring to the cost of the low dam project. I was referring to approximately \$500,000,000 cost for the whole project and of the \$75,000,000 for the low dam navigation plus the \$70,000,000 or \$80,000,000 for flood control. When I said \$75,000,000 or \$80,000,000 for floods, I was referring to the plan suggested by Mr. Kurtz, which would have given relief to floods only on the Tennessee River and the Emory, as distinguished from the Mississippi. In giving my answer on that matter of cost, I was assuming those two costs to be approximately correct, \$75,000,000 for low dam navigation plus \$70,000,000 or \$80,000,000, such as Mr. Kurtz recommended. I am taking that from the testimony. I know nothing about that myself.

"Q. If I understood you correctly, Mr. Crane, you said that one of the reasons on which you based the opinion you expressed to opposing counsel was, what you had read as to [fol. 586] the purposes of this project in the statement of the unified plan; is that correct?

A. Yes. No, not in the statement of the unified plan, but what I read in the press.

Q. In the press?

A. Yes.

Q. That is to say you accepted partly—you accepted as a part of the basis for your opinion, what you had read in the press as to the purposes for which these dams were intended?

A. Yes. Before I came here I supposed from what I had heard and read—

Q. You are not going to say what you supposed. I have no objection to your telling what you had read.

A. Well—

Q. I mean by the question I am trying to get at is this, you assume from something you read or various things that you read certain facts, came to an opinion as to what this project was really for?

A. There were many definite statements made that this project was a yardstick for power.

Q. Oh, that is what you meant?

A. That is what I meant, yes.

Q. Well, you read, did you not, this unified plan, so-called.

A. Yes.

Q. Which was sent to Congress?

A. Yes, sir.

Q. In forming your opinion, how much consideration did you give to this statement in the plan—I will show you this before you answer.

A. Yes.

Q. Under the terms of the act, section 4-J is quoted here with reference to navigation and so forth.

‘Under the terms of the Act, the board of directors has but limited discretion in determining the manner of execution of the purposes for which the Authority was created. By its express terms, the Act directs that in any plan formulated under the authority thereby conferred, priority shall [fol. 586-a] be given to the improvement of navigation in the Tennessee River and its tributaries, and to the control of flood waters in the Tennessee and Mississippi drainage basins. The Act further provides, among other things that, insofar as incidental to these objectives, the provision may be made for the generation, transmission, and sale of power that is created by the dams necessary for the accomplishment of the primary purposes. In formulating recommendations, the directors are bound by this mandate. Discretion is reposed in them to determine the emphasis to be placed on flood control as compared with that on other phases of stream control which affect navigation; and to select and to recommend the modes of development best adapted to the accomplishment of these and incidental purposes.’

Did you give any weight at all to that report, this is the statute?

A. I remember well reading that, but I did not pay a great deal of attention to it.”

That is to say, I did not wholly believe all that statement. I know that the TVA Act specifically directed that this project should be operated primarily for navigation and flood control. I stated that I believed the purpose of this whole project was primarily to generate power. I do know I had not thought of anyone violating the statute. I say that I thought that was the law, but that in my opinion, the project was designed primarily for power, to be operated primarily for power. I do not think it is being carried out in accordance with the law. I think that the directors are not operating this project at the present time primarily for navigation or flood control. I base that opinion on the factors I have already mentioned.

(The witness was excused.)

[fol. 587] FRED J. RANKIN was called as a witness on behalf of the complainants and, having been first duly sworn, was examined and testified as follows:

Direct examination:

I live in Maplewood, N. J., and am a consulting engineer employed by the Phoenix Engineering Corporation. The business of the Phoenix Engineering Corporation is almost exclusively the design and construction of properties for those public utility properties who are clients of Ebasco Service, Inc. Ebasco Service, Inc. is a service company which is wholly owned by the Electric Bond & Share Company.

I graduated from the University of Kentucky in the class of 1907 with the degree of Bachelor of Mechanical Engineering. I later received the advanced degree of electrical engineer from the same University. For about 1½ years after my graduation, I was in the employ of the General Electric Company, as what is usually known as a cadet engineer. For a period of some two years, I was in the employ of the Commonwealth Edison Company of Chicago, a part of this time as a substation operator and a part in the engineering department. For a period of about 3½ years, I was a teacher of electrical engineering at Colorado State College. Also for a period of about 3½ years, I was Chief Electric Engineer of the Colorado Public Utilities Commis-

sion. During this period, I was in charge of rate investigations, appraisals, engineering investigation and work of that nature that was undertaken by the Colorado Commission. For a period of 7½ years, I was in the employ of the Idaho Power Company, during 6½ years of which I was Chief Engineer of that company. As chief engineer of the Idaho Company, I had responsibility for the construction, operation and maintenance of all of the physical properties of the company. This was the period during which a major expansion program was undertaken and carried out. Since about the first of 1907, I have been in the continuous employ of either the Electric Bond & Share Company or one of its affiliated organizations. For about 3 years of this last period, my work had to do primarily with the examination and acquisition of public utility properties, to some extent in the United States, but largely in South America. During this time I examined and reported on properties both in the United States and in Mexico, Central America, Cuba, Venezuela, Colombia, Panama and Ecuador. Following the period of examining and acquiring properties, I served for some three years as an operating sponsor in the foreign division of Electric Bond & Share Company. My work in this connection had to do with advising with the operating forces of the local operating concerns as to operating problems generally.

Since 1933, I have been engaged primarily in special engineering investigations and studies for public utility properties that are associated with the Ebasco Service, Inc. It has been part of my duties to make studies and estimates of electric load growths and of the facilities necessary to serve them. During all of the time that I was the Chief Engineer of the Idaho Power Company, I had charge of studies of load growth that were made prior to the installation of production facilities that were installed for that company during that period. Also as a matter of regular routine, I supervised the preparation of load forecasts that were and are made a part of the annual operating budget.

In addition to this, while I was in the West, I collaborated with the joint study made by the Idaho Power Company [fol. 589] and the Utah Power & Light Company with which the Idaho Power Company is interconnected. This study covered a very large area and was made for the purpose of determining not only when facilities should be in-

stalled but where they should be located. While I was engaged in the examination and purchase of public utility properties, it was a part of our usual procedure in such examinations to make load forecasts that usually covered the period of five years. I have supervised the preparation of numerous forecasts of this character which were subsequently used as the basis for the authorization of production facilities. Also while I was employed as operating sponsor, I had something to do with the annual forecasts that were made as a part of the operating budget of these properties, and also studies and forecasts that were made in connection with further additions to generating plants.

I have investigated the adequacy of the facilities of the following complainant companies to meet their load requirements:—Carolina Power & Light Company, The Tennessee Public Service Company, Holston River Electric Company, Memphis Power & Light Company, West Tennessee Power & Light Company, Mississippi Power & Light Company, and Birmingham Electric Company. They are all clients of Ebasco Service, Inc. In making this study it was necessary to give consideration to the load requirements and adequacy of facilities of other companies which are not parties to the suit. It was necessary to give consideration to the production facilities of the Arkansas Power & Light Company and Louisiana Power & Light Company, for the reason that the facilities of all of these companies are interconnected and operated as an integrated unit. In other words, their power supply facilities are all pooled and the adequacy depends upon the adequacy of the group. I have general supervision of all [fol. 590] of these studies that have been made during the past year in connection with this work, and in addition I have devoted approximately five months of my own time to the studies.

My first contact with any of these properties was in the summer of 1927. At that time I was called upon to examine and report upon a number of properties in the Mississippi Valley which were later acquired by the present operating companies under this Mississippi Valley Group about which I have been testifying. Since that time, except only the period that I was in the foreign field, I have followed the operations of all of these properties rather

closely. Substantially all of the principal additions to the production and transmission facilities of these properties have been both designed and constructed by the Phoenix Engineering Corporation, by whom I am employed. I have also had occasion during the past four years to visit these properties on numerous occasions in connection with the load investigations, special-engineering investigations and matters of that kind. We also have in our organization the department known as "Plant Betterment" department, which analyzes monthly the performance of every one of the larger power supply concerns. I have always had these analyses available to me. In addition to that I have studied the monthly reports as they have come out during the time that I have been engaged in this case. I have also made it a point during the past year to particularly follow the monthly production reports of each of these properties. I personally selected, assembled, and analyzed data with respect to the facilities, both installed generating facilities and power available under contracts over a period of usually about ten years. Also in connection with the study I went to the field and made a personal inspection of each of the principal sources of power supply.

[fol. 591] There are two major problems involved in reaching a conclusion as to adequacy of facilities. The first is a determination of the dependable capacity or load carrying ability of the available facilities, and the second is a forecast of the loads reasonably to be expected over the future period of time. I first determined, largely from the records of the company, the loads that have actually been carried by these facilities. In addition to this, I collected data as to the rated capacity, which, while not controlling, is an important factor in determining the load carrying ability. I also studied and analyzed the contracts covering power purchased under either interchange or firm power purchases; also the capacity available to these companies from plants of secondary or consumers, which are normally closed down, but which are available to the operating companies on call.

In the group of properties comprising the Carolina Power & Light, the Tennessee Public Service and Holston River Electric Companies, the facilities are predominantly hydro electric, with steam plants which are usually held as reserve, particularly as reserve against extremely dry periods. The facilities of the properties which I will call

the Valley Group of properties are predominantly steam electric generating plants, with a large hydro electric development on the Ouachita River, which is operated primarily for peak and standby service, particularly during dry periods. The Birmingham Electric Company, of course, has no power supply facilities of its own. The load carrying ability for facilities that are principally hydro are based on the dry period of the driest year of record. This period usually extends from July to November of the year in which it occurs.

[fol. 592] I stated that in some of these companies the facilities were predominantly hydro and in others predominantly steam. There are two rather logical groupings of these power supply facilities. That is, based on the manner in which they are interconnected and operated, the facilities of the Carolina Power & Light Company, the Tennessee Public Service Company, and Holston River Electric Company were treated as a unit or group. Likewise, the facilities of the Memphis Power & Light Company, West Tennessee Power & Light Company, Mississippi Power & Light Company, together with those of the Louisiana Power & Light Company and Arkansas Power & Light Company, were treated and studied as a group. Birmingham Electric was a unit by itself in the study. Those were the three groups into which I divided it for the purposes of this study.

I studied the load requirements and the records of actual loads carried by all of these companies over a period that usually extended from about 1928 to 1936, inclusive. I assembled data as to monthly and annual peak loads, load factors, kilowatt hours generated; also classified data as to kilowatt hour sales, number of customers served, and data of that kind. The peak load is, of course, the group peak. From the data that I have testified to, and particularly data as to sales, and also from the data as to the peak loads, I developed first general load trends which are a basic factor in estimating load growth. In addition to this, I developed such factors as customer use, and kilowatt hours used annually by domestic customers, farm customers and commercial customers. Then at my request each of the companies involved, and this includes the Arkansas and Louisiana companies that are non-complainants, made detailed forecasts of kilowatt hour sales which they estimated for [fol. 593] the period 1937 to 1940, inclusive. These forecasts were submitted to me and naturally I studied and

analyzed them in connection with my work. After these reports from the field had been received, I personally visited each of the companies involved and I discussed with both the operating and the commercial executives these load forecasts, general business conditions in the territory, industrial trends and matters of that kind. Then I merely used these reports from the field as a basis and as a guide to my own determination of future loads. I gave more weight to the detailed forecasts and figures submitted to me by the individual companies than to any other factor. However, where these company forecasts appeared to me to be either overly optimistic or pessimistic or out of line with past trends, I made such adjustments as seemed to me to be proper under the circumstances. According to my experience, the developing of load trends is done regularly in the planning for the future and management of utility operations and is, I will say, standard procedure with all public utility companies with which I have ever had any connection.

There were a number of basic assumptions which were, of course, necessary in determining the adequacy of the facilities of these companies. First, I assumed that with the exception of power supply facilities in existence or authorized, there would be no substantial additions to these facilities up to the end of 1939. Then I assumed that the average usage of particularly the residential, farm and commercial classifications of service, that is the average annual usage in kilowatt hours per customer, would continue to increase as it has over a period of several years. I further assumed in determining or reaching an opinion [fol. 594] as to what this average usage might be that the rate trend stated as an average would continue to be downward as it has for a number of years and that the number of customers, particularly in those classes of service that have a large number of customers, would continue to increase first on account of further extensions into rural and outlying territories and second on account of the downward trend in rates.

With respect to the industrial loads generally, I did not make any provision in my forecast for any abnormally large increase in this class of load. I did assume, however, that this load would continue to grow and develop at a normal rate similar to its progression over the past several years. I made this assumption first for the reason that the develop-

ment of large industrial loads is very difficult, if not impossible, to forecast. I made it for the further reason that if an unusually large industry requiring a large block of power capacity should locate in the territory of any of the companies served, and if such an industry should contract with one or more of the companies involved, then in my opinion, the company or companies involved could provide power supply facilities by the time such industries would be ready to take service. That has been my general experience in cases of that kind.

I have already stated the principal assumptions in connection with my load forecasts. The two classes of load that I have not stated the assumptions for are those classes known as Government and municipal, and sales to public utilities. The Government and municipal load as a whole has shown a rather slow rate of growth over a long period of time and I assume that this rate of growth would continue. Sales to public utilities involve merely sales to utilities other than those in the integrated group or of the [fol. 595] interconnected group that rely upon the system for a part or all of their firm power. These sales are a comparative- small part of the total load, but nevertheless I assumed that such sales would increase at about the same rate as the general business of the group. In making my study of load requirements of these companies I did not give any effect to loss of load through competition or otherwise. My estimate of future loads is based upon the total load available within the service areas.

It is not quite accurate to say that the Birmingham Electric Company has no generating facilities. I should have said that it has no generating facilities which are used by that Company. Actually, the Birmingham Electric Company does own a steam electric station in the City of Birmingham with an installed capacity of 11,300 kilowatts. This plant, however, is not operated by the Birmingham Electric Company but is available to Alabama Power Company on call.

The document (offered and received in evidence as Complainants' Exhibit 374) is entitled, "Adequacy of power supply facilities, Carolina Power & Light Company, Tennessee Public Service Company and Holston River Electric Company." The first sheet of the exhibit is a summary which condenses the adequacy data for the Carolina Power & Light Company, Tennessee Public Service Company and

Holston River Electric Company. The data given cover a period of 12 years, those for the period 1929 to 1936, inclusive, being actual, and from 1937 to 1940 estimated. There is first shown the total name plate rating by companies for each of the companies within the group. Next there is shown the total amount of power in kilowatts which is available to the group under purchase and interchange agreement. Next is the capacity available to the group [fol. 596] from generating stations of clients or secondary customers that are normally closed down but are available on call. Next is shown the total peak carrying capacity of the facilities by companies for the entire period covered by the summary. Inasmuch as the facilities of this group are largely hydro electric, the peak capacity of the facilities depends entirely upon load factor of the load during the dry period, and it was found in the study of these facilities that there is a substantial amount of machine or generating capacity that cannot be utilized under existing load factor conditions. This excess capacity was, of course, deducted in order to develop the total peak carrying capacity at system load factor. Next, this summary sheet 1 shows the territorial peak load for the period, the data being actual up to and including 1936 and estimated for 1937 to 1940, inclusive. The difference between the total peak capacity and the total peak load is the gross surplus capacity available to the system. This gross capacity, however, is not firm or saleable capacity, and it is necessary to deduct from it the reserve capacity. Consequently, near the bottom of the sheet under the caption "less reserve capacity", this deduction has been made and the resulting figures are the firm capacity surplus of the system for the entire period year by year. The reserve capacity for this group consists of one steam unit at the Cape Fear Steam Plant and one hydro electric unit at the Waterville Hydro Electric Plant, rated at 15,000 kilowatts and 35,000 kilowatts, respectively. These units were provided as reserve units in planning and designing the system, and the system is so operated and I consider that the amount of reserve which I have deducted is entirely adequate for this system.

[fol. 597] There were a number of reasons for using this period of 1929 to 1940 in this study. In the first place, 1929 and 1930 considered together mark the termination of a rather long period, an active period of construction and

addition of power supply facilities to electric utility properties generally. It was to be expected that with the beginning of the depression these properties would have substantial amounts of surplus, that is, relatively substantial amounts of surplus capacity. This summary sheet clearly brings that out. Then I thought it was necessary to study loads and load growths over as long a period of time as reliable data were available for it. The study was projected up through the year 1940 for the reason that it was desired to determine first for how long a time the existing facilities would be adequate and whether or not there is or would be sufficient time to provide additional facilities wherein adequacy might exist.

All of the data shown on page 1 of Complainants' Exhibit 374 with respect to name plate ratings, excepting that part that is estimated, was obtained either from actual company records which were verified in the field or for earlier years from historical data and reports which I believe to be reliable. The amount of power available to the system under purchase interchange contracts and from the plants of the secondary customers was derived from a study and analysis of such contracts and from the operating experience of the companies thereunder. The total peak capacity of these facilities is my own determination of what the facilities, as they existed, or as they do exist, will carry. The territorial peak load and annual system load factor are two other items set out on this sheet which are actual or are derived from actual records up to and including 1936, and are estimated beyond that period. The other data on the sheet are merely derived data.

[fol. 598] Pages numbered 2 to 9, inclusive, on Complainants' Exhibit 374 summarize in detail for each of the years 1929 to 1936 the power supply facilities of the group of companies to which the exhibit refers. There is shown by plants the name plate rating and kilowatts of all generators and the dependable capacity of these plants, whether they are hydro electric or steam, under both favorable water supply conditions and under critical water supply conditions. It was necessary to determine this in order to determine the period in which the dependable capacity reached a minimum. There is shown for each of the years the power available under purchase and interchange contracts, power

available from plants and resale to secondary power customers, then the total capacity available, from which is deducted the amount assigned to reserve capacity for the particular year. Data as to territorial peak loads and system load factor are made from company records. The resulting data from these sheets were carried back and summarized on the condensed summary on page 1 of the exhibit. Sheets 2 to 9 give the real, underlying data for each of the companies, which is shown in the summary, combined form on page 1.

Page 10 of Complainants' Exhibit 374 is entitled "Summary of power requirements—Company and Territorial group", and that is briefly what it is. It sets forth first the total energy sales in kilowatt-hours by years for each of the companies in the group, these sales being actual up to and including 1936 and estimated from 1937 to 1940, inclusive. There is next shown inter-company and dump sales which are necessarily included in the statistical data as a part of the total sales. These inter-company sales are sales within the integrated group, and naturally they are deducted in order to avoid duplication in arriving at what I call "total [fol. 599] territorial sales". This sheet next shows unaccounted for losses in transmission and distribution, both in actual kilowatt-hours and in percentage of the total. Then the total territorial energy requirements, annual load factor, the peak load for the territory and the kilowatt-hour sales per kilowatt of territorial peak. I should say that as to all of the data on this sheet, they are actual or derived from actual data up to and including 1936 and then estimated beyond that period. The estimated or forecasted power loads on page 10 for the years 1937 to 1940 are actually based on one simple computation. That computation in turn is based on the assumption that over the immediate future the kilowatt sales or peak kilowatt load would remain about the present level. It will be noted from the bottom line on page 10 of this exhibit that during the year 1936 the kilowatt-hour territorial sales per kilowatt of peak load amounted to 3,490 kilowatt-hours, which, as a matter of fact, is the highest ratio reached over the entire period. I have assumed that this ratio would continue up to the end of 1940. Consequently, the forecasted kilowatt peak is arrived at merely by dividing the estimated sales in kilowatt-hours by 3,490. I think that is a reasonable assumption.

Page 11 of Complainants' Exhibit 374 is a chart or graph which shows in graphical form most of the data with respect to loads, both actual and future, to which I have testified. This exhibit shows monthly from 1928 to about June of 1937, the actual territorial peak loads, and beyond that [fol. 600] period and for the period covered it shows estimated annual peak loads. It shows also graphically kilowatt-hour sales, which are actual up to and including 1936 and estimated beyond that period. In addition to this, it shows the monthly load factor graphically, also the average monthly load in kilowatts.

The document (offered and received in evidence as Complainants' Exhibit 375) is entitled, "Adequacy of Power Supply Facilities, Arkansas Power & Light Co., Louisiana Power & Light Co., and West Tennessee Power & Light Co." The data contained in the exhibit are entirely similar in type and in substantially the same method of development as that contained for the other integrated group of properties in Complainants' Exhibit 374 which I have just explained in detail. These data are actual historical data up to and including 1936 and estimated beyond that point.

The document (offered and received in evidence as Complainants' Exhibit 376) is entitled, "Birmingham Electric Company, actual and estimated load data, 1927 to 1940, inclusive." The data therein as to actual and estimated loads was compiled in the same manner and by the same methods as the same data in Complainants' Exhibit 374. The reason why Complainants' Exhibit 376 dealing with Birmingham Electric Company includes no summary of adequacy of facilities is simply for the reason that, as I believe I have testified already, the Birmingham Electric Company purchases all of its power requirements from Alabama Power Company, and inasmuch as there are no facilities, naturally I could not show anything as to adequacy.

[fol. 601] I think there is quite a similarity between my study of the adequacy of the facilities of these companies and studies and investigations made in the course of business of public utilities generally in their consideration of whether or not additions should be added to facilities. In so far as I know, all large electric public utility companies make studies and investigations substantially of the kind that I have made before authorizing or installing additional power supply facilities. In so far as my experience goes

decisions in that respect are based upon such studies. With respect to Exhibits 374 and 375, I have formed an opinion as to the adequacy of the facilities of these two groups to meet the load requirements imposed on them at the present time and for such time in the future as would be reasonably necessary to permit the installation of additional facilities. My opinion with respect to Exhibit 374 is that the existing facilities are adequate to meet all load requirements reasonably to be expected up to and including the year 1940. This is considerably more than ample time within which to provide facilities beyond the year 1940.

Referring to Exhibit 375, my study of the facilities of those properties which was completed some two or three months ago indicated that for the year 1937 the total peak load would exceed the firm peak capacity of the facilities by some 2,250 kilowatt-hours or an overload of approximately 1%. Such a peak load, if it had been experienced, would have existed for a period of probably not more than one hour, and there is no question in my mind as to the ability of the facilities to have carried it. As a matter of fact, the peak load period for the year 1937 for this group has now passed, and the facilities were entirely adequate to carry the total load. I say that this peak load period for the year is passed for the reason that the peak of this group is the strictly seasonal one, and has always occurred, and [fol. 602] as is shown by the chart on page 7 of this exhibit, occurs during the months of September and October. My study indicates that after giving effect to the power purchased from the TVA by the Arkansas Power & Light Company, which will become available during 1938, these facilities will be adequate both for the years 1938 and 1939. This study further shows that additional capacity will be required during 1940. As a matter of fact, since, as I have testified, the peak load does not occur until September or October of the year in which it occurs, it means that there is still approximately three years remaining within which to provide additional power supply facilities. I consider this an entirely ample period for that purpose. I have already testified that the adequacy of existing facilities of the Birmingham Electric Company depends upon the adequacy of facilities of the Alabama Power Company which has been covered by another witness.

[fol. 603] Cross-examination:

I have not shown the peak demand of the Carolina Power & Light Company separately. The peak values shown there include Carolina Power & Light Company, Tennessee Public Service Company and Holston River Electric Company. Actually in order to reach the total you have to get a peak on each. On that particular group, the monthly peak loads of Carolina Power & Light Company were added to the monthly peak loads of Tennessee Public Service Company and the Holston River Electric Company. In reaching the final result shown on the next to the bottom line of the first sheet on Complainants' Exhibit 374, which is "firm power surplus", I took into consideration the demand upon these companies that might have to be met when the demand is from other power companies. I plotted the demand imposed by what you might call minor power companies who rely upon this group for either a part or all of their firm power requirements.

I heard most of the testimony of Mr. Sporn, but I did not hear that part of the testimony in which you say he testified that the Appalachian Electric Power Company had a contract with the Carolina Power & Light Company under which the Carolina Power & Light Company was obligated to deliver to the Appalachian Electric Power Company 25,000 kilowatts to meet the Appalachian Electric Power Company's peak and that that was a binding obligation on the Carolina Power & Light Company. The peak loads that are shown for this system do not include any load which the Carolina Power & Light Company might deliver to the Appalachian Electric Power Company. The arrangement between those two companies, which has been in effect for a number of years, provides substantially for the interchange of energy. The Carolina Power & Light Company does not rely upon the Appalachian Electric Power Company for any firm capacity to carry its own load and Ex-[fol. 604] hibit 374 will show very clearly that nothing has been included, so far as capacity goes, from the Appalachian Electric Power Company. On the other hand, the facilities of the Carolina Power & Light Company are such that there is always a substantial amount of capacity, generating machine capacity, available to Appalachian Electric Power Company. That is available continuously, and there is no reason why the Appalachian Electric Power Company can-

not use that as a firm source of power with the provision under the contract that whatever energy they draw out of the reservoir at the time they use that supply will be returned to us at any time they have the energy available. It can be returned, and usually is, in the form of steam power which is generated off-peak during the low load periods at night.

The Appalachian Electric Power Company could call on the Carolina Power & Light Company and get 25,000 kilowatts of capacity at any time, but it would be obligated to return energy at some time later. I believe this Exhibit 374 clearly shows that not only have we reserved a 35,000 kilowatt hydro-electric unit at Waterville, but we also, during 1937, had a surplus of machine capacity for which the Carolina Power & Light Company has no energy. The Appalachian Electric Power Company can get that power any time and use it, provided that, in effect, they will give us water with which to run it. They give us that water, so to speak, by giving us steam energy and letting us back off of the reservoirs. The Appalachian Electric Power Company could demand that the Carolina Power & Light Company supply that 25,000 kilowatts even if the demand came on the Carolina Power & Light Company's peak. They can demand it and get it during that period for the reason that I have tried to explain. I have not counted that 25,000 kilowatts, so to speak, in the facilities of the Carolina Power & Light Company. It is idle capacity, capacity that I designated as not useful under existing load factors, that is not useful to the Carolina system.

I believe that the Yadkin River Power Company was one of the predecessors of the Carolina Power & Light Company. I don't know whether it is a fact that on March 14, 1917, that company entered into a contract to purchase from the Wateree Power Company, because I have not gone that far back in history; but I do know that the Carolina Power & Light Company does purchase power at wholesale under a contract which I am quite sure was originally entered into with the Wateree Power Company. That is one of the contracts that I rely on as giving us part of our dependable firm capacity on the system. On page 9 of Exhibit 374, there is set out what we have designated as the Wateree contract. We are relying on a 14,000 kilowatt peak of firm power under that contract. The contract is cancelable on June 1, 1949, or at any time thereafter, provided

the party desiring to cancel gives three years notice, as I remember my study of the contract.

I have testified that the Arkansas Power & Light Company, Louisiana Power & Light Company, Memphis Power & Light Company, Mississippi Power & Light Company and West Tennessee Power & Light Company draw their supply of power from a common pool. The systems are completely interconnected and power is shifted from one part of the system to another and delivered where it is needed. My study shows that there would have been adequate capacity in that pool prior to June, 1937. The maximum load of that system, which is very short, occurs about September, and also about that time the Arkansas Power & Light Company completed the installation of a new unit of some 10,000 to 12,000 kilowatts capacity. I know that in June, 1937, the Arkansas Power & Light Company entered into a contract with the TVA for the purchase of considerable amounts of power. The power purchased from the TVA constitutes a part of the facilities and has been included in my figures, as set out on Complainants' Exhibit 375. Arithmetically, it is true that if you deduct the amount of power that the Arkansas Power & Light Company is going to get from the [fol. 606] TVA under that contract, there will be a definite deficit in the capacity of that system, according to my own predictions by 1940, but if that contract had not been entered into, we would have done something else for that group. It is a fair statement to say that as things now stand, our surplus arises out of the power the Arkansas Power & Light Company obtains from the TVA.

(The witness was excused.)

FRANCIS E. FROTHINGHAM was called as a witness on behalf of the complainants and, having been first duly sworn, was examined and testified as follows:

Direct examination:

I live at Cambridge, Massachusetts, and am 66 years old. When I left college, I began working in the machine shops of the Westinghouse Machine Company in Pittsburgh and learned how to construct and operate their machinery. I was then with the Westinghouse Chair & Car Company of

New York. They were selling agents of the products for the Machine Company, and I was employed on repair work for a number of years. Then, I was for some time on the drafting board, learning about the design and construction of the power houses. I then went with Stone & Webster and was with them and was largely engaged in the examination of gas, electric, street railway, interurban and power properties. In that connection, I traveled all over the United States and Canada. I then went with Perry, Coffin & Burr, an investment house of Boston, which specializes in investment securities. I was on what was known as the buying end of that business, and in connection with the studies involved in that work, I travelled all over the United States, Canada, Mexico and a substantial part of South America. In 1916, when Mr. Perry dropped out of that concern, I [fol. 607] became its vice president and have filled that position since. I was recently elected President of the Investment Bankers Association of America for the coming year.

The investment market, when lending money to utility companies on their properties or investing in their securities, wants to have made for its benefit very careful and elaborate studies of the situations in which they are thinking of making investments, and it has been my position within such capacities as I have, to make those examinations for my concern. As I say, those overlap street railway, interurban railway, gas, electric, light and power.

Examination by the Court:

By examination I mean an examination of the whole situation, physical and otherwise.

Direct examination continued:

The factors which are examined and considered by the investment market include an investigation into the franchises and competitive conditions of the utility, its condition and its adequacy, and an investigation into the conditions under which the company does business, its authority from state commissions, legislatures and otherwise. It looks into the management of property, the earnings, classifying them, studying them, studying the present situation, the character of the territory, the prospects for the growth of the [fol. 608] territory and enlargement of the company and

its ability adequately to raise the necessary facilities for the conduct of its business. Those things having been weighed, as well as possible to weigh them, a decision is made, for instance, by my concern, as to whether or not they will make an investment. The question of competition, of course, is fundamental in the whole situation. The matter of competition is one of cost, which is of fundamental importance whenever any investor risks his funds. In the case of public utilities, he wants to know whether or not the certificate of convenience and necessity is a part of the law of the state before a competitor may compete with him. He inquires into what the general laws may or may not permit. He looks to other surrounding agencies to see to what extent they may or may not be in position to engage in competition. Those questions are raised with a great degree of regularity, as well as many others before an investment buyer can be induced to come forth. It is always so.

May I say that while the different considerations that I have mentioned must weight in the final judgment of a situation, there not infrequently comes a time when one of those factors looms so large and so important that it takes paramount consideration. That is the case in this situation.

I have been familiar with the properties and securities of all of the companies that are complainants in this suit, perhaps particularly with the Alabama Power Company, for the period prior to 1933. Just before the war, Mr. James [fol. 609] Mitchell had expended some \$12,000,000 of British money in building a hydro-electric plant on the Coosa River and building transmission lines with the idea of furnishing the state of Alabama with the first abundant supply of electric current that it had had. With the coming on of the war, that source of funds dried up, and as a result of discussions, negotiations and an examination on the grounds, Harris Forbes & Company and my house bought a first mortgage bond issue, which was placed on the property, the \$12,000,000 that had been spent being lifted from the property, so that the first mortgage lien could be created. From then until today, we have financed the bonds of that company. I am intimately familiar with the property, with the management, with the individuals connected with it and with the whole situation.

As to what was the attitude of the investment market prior to 1933 toward securities of Alabama Power Com-

pany, The Tennessee Electric Power Company and complainant companies in the area where TVA operates, the larger and stronger companies in this territory had free access to the investment market and were never at any time deprived of necessary funds to carry on their respective operations. They were able to finance at rates comparable to the general market for utility companies of that size; there is no doubt about that. Prior to 1933, part of the interest of the investment market in the Southern properties was the expectation of growth of the South, increase in population, its increased industrialization. Such factors are [fol. 610] always taken into consideration by an investor.

I have studied and kept myself familiar with the securities of such companies as the Alabama Power Company, The Tennessee Electric Power Company, Mississippi Power Company, Tennessee Public Service Company and companies carrying on an electric business in the TVA area since 1933.

“Q. And will you state what, if any, change in attitude has taken place in the investment market towards the securities of such companies since 1933?

Mr. O'Brian: To that I object as speculative, and no proper foundation being laid for the answer.

Mr. R. T. Jackson: I can qualify him further as to his being in the business.

Judge Allen: The objection is sustained.

Mr. R. T. Jackson: And an exception will be allowed, please?

Judge Allen: The Court considers that the question embodies fluctuations in the market.

Mr. R. T. Jackson: This is not intended to do that. It is intended to indicate a change in attitude towards these particular securities of the investment market. I will try to reframe the question, and perhaps I will meet the objection that the Court suggests.

Q. Mr. Frothingham, will you please state what change, if any, has occurred in the attitude of the investment market towards the securities of these companies since 1933, apart from the general fluctuations of the market, and which are peculiar to these companies.

Mr. Fly: May we know what companies we are talking about, whether there are two or three selected, or whether

we are talking about the 18 companies, each and everyone? The question is ambiguous and misleading.

Judge Allen: Will you frame your question so as to meet that?

Mr. R. T. Jackson: I wonder if I might say in answering that question, I would like the witness to consider the Alabama Power Company, the Mississippi Power Company, the Tennessee Electric Power Company, Tennessee Public Service Company, the West Tennessee Power Company, Memphis Power & Light Company, Kentucky-Tennessee Power Company, Holston River Company, Kentucky-West Virginia Company,—

Judge Allen: All of the complainants except the Georgia Power Company.

[fol. 611] Mr. R. T. Jackson: Well, I want him to consider those that he has any differentiation to draw between, I will expect him to draw them, of course, not the Georgia Power Company, which I understand is not a party.

Mr. Fly: Are you excluding any other complainants?

Mr. R. T. Jackson: No, I am not, unless the witness excludes it in his answer.

Mr. Fly: Does he know who the complainants are? Ask him if he knows.

Mr. R. T. Jackson: I will give him a list of them.

The Witness: I know.

Judge Allen: He may answer.

Mr. O'Brian: May I interpose an objection on a different ground? The attitude of the investment market is what the witness is asked for, not his own opinion. That manifestly is a question that does not subject itself to expert evidence.

Mr. R. T. Jackson: I don't think that is true.

Judge Allen: The objection is sustained upon that.

Mr. R. T. Jackson: If your Honor please, I would not know who could tell what the attitude of the investors' market is, unless it was an expert in that market.

Judge Allen: The objection is sustained.

Mr. R. T. Jackson: An exception, please."

As to whether in my opinion the ability of these Companies to refinance their outstanding bonds and to engage in new financing has been adversely affected since 1933 by TVA's activities, the general statement can be made that the investment market has completely dried up so far as funds

are available for the required operations of these various properties in this district I listed exist. The explanation for this fact will be found in this. The ordinary theory and practice of capital structure is to divide it between fixed or bonded debt and equity. The fixed money obligation never provides sufficient funds for the full money requirements of operations, the building of physical plant and property. The balance of those funds must come from equity securities. That equity money provides the cushion which protects the bond. Those sources of equity supply have completely dried up. By "drying up" I mean that those having money to invest are unwilling to buy the equity securities of the companies which are subjected to the peculiar threat to which these are subjected today, because in the event of further aggression, in the event of the difficulties multiplying, they are the first to stand the brunt of loss.

Examination by the Court:

In the use of the term "equity securities," I do not mean to include junior lien bonds, as well as stock. I mean securities which are not protected by an indenture of trust, such as preferred and common stocks and similar classifications of securities.

Direct examination continued:

If then, such equity money is not available, the question is not should it be available or not; the question is, is it available. The fact of the situation shows that it is not available. Then, the bond money is itself not adequately protected by the cushion which it requires and it is not forthcoming. The result is that the financial process is slowed up and stopped. The moneys which these various properties have been securing for enlargements and expansions of their property in the recent past, have come not from the public, but have come from holding company sources, and in course of time, those holding company sources themselves dry up. That simply means that these situations, taking them by and large, face a condition where they cannot normally get from the public the moneys which they would easily otherwise get. They are not in a position to carry on the necessary extensions, and what not, of their business, with the inevitable result that in the course of time their capacities prove to be inadequate, and then the opportunity comes, and perhaps

the necessity comes for further aggressions on the part of Government, which still further complicate and injure the situation. That is as brief as I can make the general statement on that subject.

Based upon my experience in and knowledge of the investment [fol. 613] market since 1933 and before, it would, in my opinion, have been possible for these complainant companies to have refinanced their outstanding bonds at substantial interest savings, but for the activity of the Tennessee Valley Authority. There is no possibility of doubt of it. In some cases, refinancing could not have taken place, because the properties are relatively small or relatively immature. In the most cases, refunding could have been put through to the great advantage of the properties. The larger companies ranked in a class which made that possible. They were in high esteem in the investment market. To have refunded such a situation as the Alabama Power Company, for instance, to have substituted even a four per cent coupon for a five per cent coupon, would have saved in the neighborhood of a million dollars of interest charges. The refinancing of six or seven per cent preferred stocks into lower coupon stocks would have again saved the outgo on dividends.

I think that there are distinctions that should be drawn between certain of the large company complainants in this case in respect of the matter of the factor about which I was testifying. I would perhaps put the Appalachian Electric Power Company in a class by itself in this group as being rather more remote in the major part of the territories it occupies to the threats of the TVA than are the other companies. Not only that, but the character of its property is such, being scattered, with substantial communities in it and the availability of low-priced steam power, that it puts that Company in a less vulnerable position than the others.

There is a most decided difference in the relationship between investment turnover in the case of utility operations as compared with the financing of other types of business. Quite a special difference applies to utility operations. In [fol. 614] utility operations, experience has shown that it takes five or more dollars of investment to produce one dollar of gross. That means that it takes five years to complete the turnover of capital invested. In other types of industry, the turnover is many times a year, and that condition does not exist in utility operation. In the case of utilities,

also, it has come to be the practice that they do not turn back into their properties any of their earnings as other industries do, with the result that all of the money which utility operations require for their needs has to come from the public. That is another important distinction. On the other hand, the Government provides all of the funds that are required for the various needs of its operations, whether those funds are earning or not. Some investors think those funds are forthcoming with an unusual degree of lavishness.

Cross-examination:

I think the Appalachian Electric Power Company, of which I spoke, owns all of the securities of the Kentucky-West Virginia Power Company and Kingsport Utilities, Inc.

I do not know that I was inclusive, but I mentioned some of the factors which enter into the determination of an underwriter or one financing securities as to the desirability of the proposed investment. I suppose that in addition to those I mentioned, it is fair to say the real test is how attractive the security is going to be to the ultimate consumer. Undoubtedly, one of those factors is whether or not the security is listed on an exchange. I might say it is not so important a factor as is sometimes considered. As to whether or not the security is a listed security frequently makes a difference in the desirability of the security for borrowing purposes. A listed security has that advantage. Frequently, a well-known security, however, unlisted, has borrowing value. There are many banks and trust companies, especially in the north, that prefer to loan on securities listed on the well recognized exchanges and the best market in that narrow sense is the New York Stock Exchange. In considering refinancing securities, a factor undoubtedly taken into consideration is an investigation of what the market has been for the previous securities then in existence, that is, what turnover there has been. Speaking in general terms, terms of generalization, the securities which are not sold perhaps every day, are customarily considered less desirable than those securities having an active market. If you state it as a general proposition, it is probable that it is more difficult to borrow money upon inactive securities as contrasted with the more active securities. Inactive markets sometimes result in what are called thin

markets with a wide degree of quoted fluctuation. It is not easy to answer the question whether securities which are listed on the New York Stock Exchange or the New York Curb Exchange ordinarily command a slightly better market than securities not so listed. I suppose one would probably say yes. There are so many special cases that come in to disturb the correctness of that. Generally speaking, the more actively saleable a security is the more attractive it is.

I simply cannot tell you how many of the complainants have any securities listed on the New York Stock Exchange. I don't know. I would have to look it up and see. The matter has not impressed me as of any consequence under these conditions, and I have not looked it up. In testifying I did not give any regard to that distinction as I did not think it relevant. If it were true that only one of these complainants had its securities listed on the New York Stock Exchange, that would differentiate that complainant from the others in that respect as to the desirability of investment on the part of certain investors.

[fol. 616] Securities are also affected as to marketability, or desirability, or attractiveness, by the question of whether or not they are available for purchase by savings banks or for trust funds or by life insurance companies. That is a factor also which differentiates securities of one company from another. At least in the north, the states customarily have regulations by law governing investments by savings banks and by life insurance companies which are called "legal trust funds". There is no question of the fact that on the ordinary daily market public utility securities are bought and sold in competition with other utility securities. The investment is always selected, but unfortunately not always carefully selected. Unquestionably, another factor is what we call in general terms the state of the money market, as to whether money is readily available for investment. It is a considerable factor.

I don't think I would go to the extent of saying that today it would be very difficult for any utility other than one of the great nationally known utilities with listed stocks to refinance at a considerable savings.

"Q. You would say, however, would you not, that speaking of the market conditions as they exist today, it is certainly much more difficult today to finance a utility or an industrial than it is in times when business conditions are

good, and money is in the language of the street cheap or plentiful; that is a generalization.

A. If I might I would like to say that I don't think that the conditions existing at the moment are what I would call germane to the general question, so that I have set them aside as not being weighty in my judgment of the whole situation.

Q. I appreciate that, but the court may take a different view.

A. Certainly.

Q. It has differed with me several times.

A. The Court wanted to hear my judgment.

Q. You didn't give any attention to that in answering [fol. 617] your question,—I mean you left that out of consideration?

A. I did leave it out for the same reason that this morning I said that the factor of competition was the paramount one in weighing the various factors.

Q. Is it fair to say that is the only factor you considered in answering the questions of Mr. Jackson?

Q. The question of competition?

Q. Yes.

A. In my judgment, and my judgment may be faulty, I can only give my judgment to the best of my ability, the factor of the TVA approach in this general territory is paramount to all other considerations.

Q. I so understood.

A. It is sufficient in itself to set in the background all of the other factors. It is sufficient in itself to put into the background these other various collateral points that the gentleman has inquired about.

Q. I understood you so to testify, and I am simply asking whether you laid all of these other factors aside in answering Mr. Jackson's questions?

A. I weighed them and laid them aside, as I say.

Q. In order to induce investors to purchase new securities issued at a lower yield, you must either offer something better than the old security or the conditions in the money market must be definitely favorable?

A. Those factors have to be weighed.

Q. That goes without saying?

A. Without saying, yes."

My recollection is that there are only two of these complainant companies which have no securities at all in the hands of the general public. I may be mistaken, but one may be the Kentucky-West Virginia Power Company, one the Holston River Electric Company, I am not sure. I don't think the stock of the West Tennessee Power & Light Company is held by the public. I don't know which company owns it. I don't think the Holston River Electric Company has any securities in the hands of the public. I don't remember whether the Kentucky-Tennessee Light & [fol. 617a] Power Company has any securities in the hands of the public. Those are facts, whatever they are. Very likely the Southern Tennessee Power Company has no securities in the hands of the general public; I am not sure about that. Assuming that the six corporations that have been named have no securities outstanding in the hands of the general public, they would be in a somewhat different class from the remaining complainants with regard to that ownership. They would not be in any different class should they endeavor to place their securities on the market. The [fol. 618] companies which are owned by certain others and do not make any appeal to the public for their funds are in a different class from the companies whose securities are in the hands of the public and who had to seek money from the public by virtue of their different ownership. But they are in the same category with reference to any opportunity they may have to reach out for public funds. Assuming that these companies had in the past been obtaining their money for operations from the parent company, these subsidiaries would not make a direct appeal to the public so long as they got their funds from the holding company and, as I pointed out this morning, the holding company funds are not inexhaustible.

I have been presenting my thought entirely and addressing myself entirely to the ability of these various companies to get funds from the public. And, from that point of view, it makes little difference in my state of mind towards the subject as to how the securities may at the moment be owned. The inability of these companies to get money from the public is the point that I have concentrated on.

Examination by the Court:

The holding company gets its money by virtue of the diversity factor of business which it has in owning different situations and being able to offer to the public a security which is protected by that type of diversity factor, so that it is in a peculiarly favorable position to raise equity moneys when equity moneys can be raised. At the present time they cannot be.

Cross-examination continued:

As to whether the holding company receiving dividends from the subsidiary operating company has that amount of money in hand, it has whatever income it gets that way, yes. In so far as those funds are not used for its own dividend purposes, it does not need to appeal to the public.

I can only say that I see no distinction between the companies [fol. 619] which are wholly owned subsidiaries and the other companies from the point of view of their ability to get public funds. Ordinarily, a larger company like the holding company would find it easier to raise money with the public under the same conditions than a minor subsidiary would, but the conditions are not today ordinary. If one of these complainant companies had very poor earnings, it would certainly be true that it would have more difficulty refinancing itself under the same conditions than a company which had excellent earnings and that would be true whether there was the threat of competition or not. Even if the threat of competition were removed, that particular company would have a great deal of difficulty in refinancing itself, unless its earnings were satisfactory. There is no possibility of doubt on that.

As to whether I assumed that all of these companies except Appalachian Electric Power Company were equally affected by the threat of this competition, I definitely stated, if I recall, that the companies differed among themselves in respect to the degree to which they were affected by the threat of this competition, but that all were subject to that threat to an extent that it made it impossible for them to reach public funds.

So far as I know, my house does not own any of the securities of any of the complainant companies. A house like mine buys its securities for its own account and resells them.

We do not buy for ownership. So far as I know, we do not own a security of them. I think that I have been reasonably familiar with the entire situation of the Alabama Power Company by reason of my connection. I am not as familiar with the Mississippi Power & Light Company as I am with the larger companies. These are rather newer companies. I have been over the territory and our men have studied them with great care. By my testimony as to remoteness, I mean some of these companies are more immediately affected than others by this threat and that all [fol. 620] are to some degree. I doubt if my house has marketed any securities of these companies in the last three years. It is possible, if a customer has come in and said he wanted a bond, we might pick it up on the market, but I doubt if we have handled any.

If any of the companies in this case have, at the present time, a record of defaults in interest payments or arrearages on their cumulative preferred stocks, that factor would differentiate them from those whose securities have no such drawbacks, and they would undoubtedly have a greater difficulty in refinancing themselves than other complainants under similar conditions without that handicap. It is perfectly obvious that even if there were no threat of competition, that condition is not a healthy condition in which to refinance a corporation. That is due to the fact that the lack of coverage, or apparent lack of coverage, frightens off or deters the investor.

When I spoke of the Appalachian Company, I meant the large Appalachian. I think it is very probable that the first fives of that company were quoted as high as 107 in 1936. It is very likely that in 1936, the first fives of that same Appalachian Company were quoted at prices ranging from 106.5 to 108.5 and that the same securities of this same company were reported in 1936 to range from 98 to 107. It may be that the 107 mentioned for the last company mentioned was the highest price in six years, but I would not call it a high price on the coupon list. In my opinion, the threat of the TVA had a very definite effect on investors in those bonds. I think they would have sold higher. As to whether this same company's 6% debentures sold in 1936 on the New York Curb at the high point of 121 and as low as 113, I do not have the figures. The high point of 121 for 1936 was undoubtedly high for that

company. It may also be that the company's 6% preferred stock ranged from $97\frac{1}{2}$ to 108. It is very likely that those were the high points for those stocks in the last six years. [fol. 621] I would say the threat of TVA operations was the reason that, although the Alabama Power Company's high on its seven per cent preferred of $113\frac{1}{2}$ in 1930, in 1933, it was only 26. That threat put in its appearance in 1933 and 1934. I am not interested in any particular date. I am interested in something much more fundamental in my judgment. The Alabama five per cent preferred stock was bid at 21 in 1933; 30 in 1934; 59 in 1935; 59 in 1936; and in the year 1937 has varied from 65 to 50. Its six per cent stock was 25, low, in 1933; $32\frac{1}{2}$ in 1934; 37 in 1935; 58 in 1936; and 58 now, low. The seven per cent stock was 26 in 1933; $31\frac{3}{4}$ in 1934; in 1935, $41\frac{3}{4}$; in 1936, $67\frac{1}{2}$; and low for 1937 is 67. That is to me an abundant record, quite independent of dates, that the preferred stock has been very seriously injured by what is going on in the state of Alabama. You are correct in stating that in each of those cases, the preferred stock has steadily risen in value from the time the threat of TVA competition began to the present time. It would be an interesting way of putting it to state that the fact that it has risen steadily in price is certainly a demonstration that the rise was not due to the TVA.

The first refunding bonds of the Carolina Power & Light Company touched a low of 46 in 1932; in 1933, a low of 52; in 1934 a low of 83; in 1935 a low of 98; in 1937, a low of 91, which is a 5.80 yield basis. And they touched a high for 1937 of 105.75. The \$7,500,000 Yadkin River bonds, which are prior liens, touched 63 in 1932; in 1933 they touched 66; in 1934, 95.5; in 1935, 106; 1936, 106. They are now from [fol. 622] 105 high to $100\frac{3}{4}$ low. My record shows Mississippi Power & Light Company touched 40 in 1933; $48\frac{3}{4}$ in 1934; 52 in 1935; $79\frac{1}{2}$ in 1936, and a high of $101\frac{1}{2}$ in 1937 and a low of 78. All of which quotations I would like to say indicate distress, although conceivably a decreasing sense of distress. In each of the bond issues that I have referred to specifically, the market has steadily risen, but in my opinion, certainly has not risen as high as it would have risen but for the effect of the TVA threat.

Several of these complainant companies have shown very substantial increases from 1933 to 1936 in earnings, in

gross receipts. Most of the larger companies did. It is very likely a fact that there was an arrearage in the cumulative preferred stock of the Birmingham Electric Company of \$214,000, which still exists. There well might be outstanding arrearages on preferred stock of Tennessee Public Service Company of \$533,000 at this time. It is entirely possible that on the six per cent cumulative second preferred stock of the Mississippi Power & Light Company there are arrearages now of \$822,500, and on the six per cent first cumulative preferred, there are arrearages outstanding of \$689,497. I assume you have the facts. I have not got them. Assuming that to be true, however, I don't think it is quite fair to say that it would be very difficult for that company to refinance itself at the present time, regardless of whether or not it was threatened with TVA competition. The situations cannot be analyzed and segregated with that degree of definiteness. What I am here for is to give my judgment as to the effect on the credit of these various companies, and credit means ability to raise money in competition in the markets, as the result of the divers and sundry threats that they are subjected to. And I say my best judgment is—others may differ from [fol. 623] me—but my judgment is those things are such as to make their reaching public funds out of the question. I am not particularly interested in these other details. Assuming that a company has outstanding at the present time arrearages on its cumulative preferred stocks of over a million and a half dollars, so far as being difficult, that company cannot finance itself as well as one that is not in arrears. I do not know the entire surrounding circumstances, how it might refinance itself to take care of the arrearage, the occasion of the arrearages. There are many factors which come into that question. That company would find it more difficult to refinance whether or not it was threatened by TVA, but that is not the question outstanding today in the minds of the investing public. That is my opinion. It may be worth nothing.

If it were true that the Federal Trade Commission had reported what it believed to be a wrongful write-up in the capital structure of some of these companies, that would undoubtedly be something of a factor to be weighed by investors in that particular company. In answer to whether, if the Federal Trade Commission reported a write-up in

the Tennessee Public Service Company in 1931 of something over four and a half million dollars that would be something of a deterrent to an investor, I happen to know something about that situation and I question the conclusion. To inject the question of write-up, I must say, I can not help it, is an attempt to divert the question from the paramount issue of competition in Knoxville. Undoubtedly no one would gainsay that a widely publicized report by the Federal Trade Commission that there was an unjustified write-up would have a deterring effect on the average investor. If the officers of the complainant companies for the last three years repeatedly stated publicly that the threat of competition would seriously affect their businesses, those statements, if made, would have a deterring effect on the purchaser of stocks, and I think under the complete disclosure theory they should and would be made.

As to whether I am in a position to state the earnings of the respective complainants during the past three years and whether I laid aside that factor, the earnings of several of the larger companies, among the complainants, have gone up materially during the past three years, the gross receipts have. Nevertheless, they have not yet reached the point where the margin of production cost, bond interest, and margin of protection against preferred stock interest have reached the normal levels, which would of themselves induce investment. Furthermore, I would like very much to say in connection with that increase in business, in my judgment, it contains something of a menace rather than being to the good,—something of a menace for this reason. I pointed out this morning the inability of the companies to get money to carry on their affairs. The increase in business means that the time will be reached so much sooner when they will be unable to expand, because they are unable to enlarge the capacities and that will bring down on them so much sooner the continuous accusation by the Government of their inability to take up the slack, so that increase in business is rather a matter of concern, rather than increased prosperity of the company.

The prices of the securities that I named have risen steadily in the last three years, but have not by any means approximated the levels which they would take under

normal conditions. My judgment is unqualified that without TVA, these companies would have reached the financial markets and secured all the funds they wanted, expanded their operations and have had credit comparable with [fol. 625] other companies more or less similarly placed that these companies do not enjoy.

Examination by the Court:

I have just stated in connection with the earnings that I looked upon the increase in earnings as rather threatening to the future well being of the companies rather than otherwise. I undoubtedly have taken the earnings and increase in amounts paid for the bonds into consideration in my answer.

Redirect examination:

In expressing the opinions that I have expressed in my testimony, in answer to questions with reference to the effect of listing on stock exchanges and things of that character upon the marketability of securities, including bonds and preferred stocks, I tried to consider the position of the securities of these companies in those respects in relation to the general market before 1933 and since.

"Q. And if there has been any change in that respect since 1933 would it have been favorable or otherwise from the standpoint of increased listing, and so forth, of securities?

Mr. O'Brian: To that I object as wholly speculative, and no proper foundation being laid. I asked him nothing about—

Judge Allen: Objection sustained.

Mr. R. T. Jackson: Exception noted, please.

Q. Mr. Frothingham, do you know whether or not the Wisconsin Power & Light Company refinanced its bonds within recent years, or within the last year or two, at the four per cent coupon rate, with outstanding accumulated defaults on its preferred stock, and without earnings at the present time sufficient to pay current dividends on preferred stock.

Mr. O'Brian: We object to that.

Judge Allen: The objection is sustained.

Mr. R. T. Jackson: May we have an exception, please?

Q. Mr. Frothingham, will you state whether or not various utilities away from the TVA area have refinanced [fol. 626] their bonds at a lower coupon rate, within the last—before the objection and ruling I would like to state something—within the last few years, notwithstanding accumulated preferred dividends?

Now I want to say that I am not asking that question merely to circumvent the Court's ruling. It occurred to me that the other ruling might be based upon the ground that I had asked about a specific company, and was therefore leading, and I am here attempting to ask a general question which as I see it meets the general inquiry which was made by the cross examiner.

Mr. O'Brian: I desire to object to that question on the same ground that I did before.

Judge Allen: Just a moment please. The objection is sustained. The Court considers this subject remote and speculative. I might say we consider that we have been quite liberal in allowing the questioning that has been permitted along this line.

Mr. R. T. Jackson: I will say the only reason I asked it was in response to the cross-examination which I thought had made it germane. Undoubtedly the cross-examination was far afield, and I should have objected to it. Note an exception please, for the record.

Q. Mr. Frothingham, will you state, if you know, whether there has been any refinancing of public utility companies in the TVA area?

A. So far as I know, none.

Q. Mr. Frothingham, will you state, if you know, whether there has been any substantial amount of refinancing among public utilities outside of the TVA area?

Mr. O'Brian: To that I object also as irrelevant and immaterial, too remote and speculative in its bearing.

Judge Allen: The Court will permit the witness to answer this one question.

A. There has been a very great deal of such refinancing.

Mr. R. T. Jackson: With that caution from the Court I will ask no further questions. That is all. You may come down."

(The witness was excused.)

[fol. 627] JOHN W. WOODALL was called as a witness on behalf of the complainants, and having been first duly sworn was examined and testified as follows:

Direct examination:

I live in Scottsboro, Alabama, and am manager of the Scottsboro Ice & Coal Company and Mayor of Scottsboro. I have been Mayor since October 5, 1936. Scottsboro is in Jackson County, Alabama.

Last summer I attended a meeting in the offices of Proctor & Snodgrass at Scottsboro, Alabama. John Vincent, one of the City Aldermen, John M. Snodgrass, J. M. Proctor, and I were present. I am pretty sure that is all that was present. There was also a gentleman who was introduced as a representative of the TVA. They introduced him to me as Mr. Beauchamp of the TVA. Mr. Vincent called me over the telephone and asked me if I would come over to Proctor & Snodgrass' law office, and that Mr. Beauchamp was over there, and they wanted to have a conference, or something to that effect. I don't remember the exact words. That was the first knowledge that I had had of a meeting of that kind. I don't remember the month, but we had an election there in July, 1937, and it was sometime prior to that. I was mainly a listener at the meeting and the others did most of the talking. The topic of their conversation was the TVA and how to get it in there. Mr. Vincent is a member of the Council. Mr. Beauchamp answered their questions.

"Q. Generally what was the nature of information or discussion that he gave, just briefly?

A. Well, I just don't remember exactly.

[fol. 628] Mr. Fly: May we have, rather than what one party said, may we have the entire conversation so that we will know how this came about? I don't think the inquiry is relevant anyway, your Honor, but I think we ought to have it accurately if we are going into it.

Mr. Bouldin: I was trying to confine this as much as possible to the remarks made by the TVA representative, if your Honor please.

Judge Allen: Are you objecting, Mr. Fly, or not?

Mr. Fly: Yes, your Honor, I think I must object, if we start to wasting time in this way.

Judge Allen: Who is Mr. Beauchamp, Mr. Fly?

Mr. Fly: Mr. Beauchamp is an employee of the TVA, your Honor.

Judge Allen: What is his office?

Mr. Fly: He is division engineer for North Alabama.

Judge Allen: Mr. Bouldin, just what do you expect to show by this witness?

Mr. Bouldin: I simply expect to show that Mr. Beauchamp advised Mr. Woodall and other members of the Council as to what would be necessary for the city to do in order to obtain TVA power.

Judge Allen: The objection is sustained. The evidence is cumulative, and we consider it immaterial. Objection sustained, and you may have your exception.

Mr. Bouldin: Exception.

Mr. R. T. Jackson: May the record show the purpose is to prove solicitation?

Judge Allen: We have asked for the purpose.

Judge Martin: We asked for that just a moment ago, the purpose.

Mr. S. D. L. Jackson: May we make a statement in the record as an offer to prove, if your Honor please?

Judge Allen: That statement stands as an offer to prove. What else do you expect to prove?

[fol. 629] Mr. S. D. L. Jackson: If the Court please, I think under the rule we should be permitted to state for the record not only what the purpose of the evidence is, which, of course, would be a most general statement, in answer to an inquiry from the Court, but the character of the evidence that the witness would give if he were permitted to answer. I think that is the language of Equity Rule 46, if I recall the rule correctly.

Judge Allen: No, Equity Rule 46 says that the Court shall make a statement merely showing the nature of the evidence. It does not say that the evidence shall be verbatim.

Mr. S. D. L. Jackson: No, I understand that, your Honor. But the point I am trying to make clear is that a mere statement from counsel in answer to the Court's question as to the general purpose sought to be served by a line of testimony,—and that is I understand what Mr. Bouldin stated in answer to your Honor's question—would not be a statement of the character of the evidence sought to be elicited

from the witness, and the form in which it is sought to be elicited is as set forth in Equity Rule 46.

Judge Allen: Mr. Jackson, I don't think that we are at all apart in the end that we both seek, except that the Court does not consider that a statement of the verbatim testimony of the witness is necessary in order to show the character of the evidence rejected.

The Court has been trying to make counsel confine their offers of proof for the sake of this record, to the salient points of the evidence. Now, when counsel dictates extemporaneously a statement, it very often takes on the nature of a long dissertation. That has happened in this case a good many times.

Mr. S. D. L. Jackson: I can assure your Honor that this one will not. It will be very briefly stated, but I do earnestly implore the Court to permit us to make a slightly more elaborate statement of the character of the evidence, or submit to the Court information from which such a statement may be made, rather than just the bare answer to your Honor's question which Mr. Bouldin stated a moment ago.

Judge Allen: You may proceed, Mr. Jackson. Confine yourself to the salient facts.

.

Mr. S. D. L. Jackson: If the witness were permitted to give this testimony and testimony on succeeding questions [fol. 630] relating to this same matter, he would state that Mr. Beauchamp advised the city as to the method to proceed in holding an election and stated that he would furnish them with certain literature for use in the election; that the document that has been marked as Complainants' Exhibit No. 377, and in addition a TVA circular are all of the literature that were received and circulated at Scottsboro prior to the election, pursuant to that offer of literature."

The contingent power contract for residential customers, (offered in evidence as Complainants' Exhibit 377) was circulated in Scottsboro prior to the election that was held sometime in July, I don't just remember that date. That contract was signed by a substantial number of people in Scottsboro, Alabama. I would guess 85 to 90% of the electric users in Scottsboro signed that contract. The City Council of Scottsboro had several meetings, and if it was

ever written up in the minutes that this certain contract would be circulated, I just don't recall it. Now, it might have been, I don't have the minutes with me, and I have not examined them, but I don't think it was. I never authorized any one to use my name in the body of the contract.

Cross-examination:

When the matter came up to hold an election in Scottsboro, there was, as I remember, a resolution passed to hold the election, and I signed the order to hold the election. I appointed a committee to run the city's end of the election, but I don't know who circulated those contracts. The City of Scottsboro does not have a contract with the TVA for wholesale power.

"Mr. Fly: I object to the exhibit as irrelevant, as showing no connection with the TVA.

Judge Allen: The objection is sustained. Exhibit 377 is excluded and you may have your exception.

Mr. S. D. L. Jackson: Exception."

(The witness was excused.)

[fol. 631] HURST MAULDIN was called as a witness on behalf of the complainants and, having been first duly sworn, examined and testified as follows:

Direct examination:

I reside in Huntsville, Alabama, and am an employe of the Alabama Power Company. I attended a meeting which was held in the Community of Fyffe in October, 1935, at which there was a discussion of the use by the people of that community of electric power. The representatives of the TVA present at the meeting were David E. Lilienthal, Mr. Beauchamp, also Dr. H. A. Morgan. The meeting was held at the High School at Fyffe, about 200 high school pupils being present and about 50 adults.

"Judge Allen: What do you expect to prove by this witness in addition to the meeting and the speeches?

Mr. Bouldin: We expect to prove, your Honor, that at this meeting Mr. Lilienthal invited the people present to another meeting at Guntersville, Alabama the next day.

And on the next day Mr. Lilienthal made some invitations——

Judge Allen: Another speech?

Mr. Bouldin (continued): —in a speech, made an invitation to the people of that community, and stated that they must organize to get TVA power; and further that he offered the cooperation of the TVA in obtaining that power, and forwarding those organizations.

Q. At this first meeting, Mr. Mauldin, the meeting to which you have just referred, what did Mr. Lilienthal say in substance?

Mr. Fly: We object to the speeches, your Honor.

Judge Allen: The objection is sustained. The Court adheres to its ruling with reference to the speeches."


[fol. 632] Mr. Lilienthal at this meeting invited the people present to a meeting the following day at Guntersville, Alabama, which I also attended. I don't recall the paper report, but there were several thousand people present. Mr. Lilienthal was present and spoke at that meeting.

"Q. What, if anything, did Mr. Lilienthal say would be required of the people of a community in order to obtain TVA power?

Mr. Fly: Objection to the speech.

Judge Allen: The objection is sustained, on the grounds hitherto stated, and the Court will add this, very many considerations arise in this case because of the number of complainants and the character of the controversy which must be of practical importance. If there is anything material in these speeches the Court thinks that evidence of the same sort of thing is in this record. Now, if the Court were to admit evidence of this speech and that speech, then the other side, the defendants have the right to dispute that that was said. This case could well run on for years if every address were to be drawn into the controversy. You may have your exception.

Mr. Bouldin: Realizing that, your Honor, the particular reason for the presentation of this testimony is that we intended to follow it up with another witness which showed the effect, the practical effect of this particular speech in this locality.



Judge Allen: We understand the possible effect of these things, but the ruling stands:

Mr. S. D. L. Jackson: May we have an exception, and as a succinct offer to prove I would like to state had the witness been permitted to answer he would have stated Mr. Lilienthal said in substance that the farmer must organize, that progress in getting electricity is not going to come without that kind of organization, that the TVA wanted to work with the people, and wanted them to work with the TVA, and that TVA was asking as earnestly as men ever asked that the people themselves cooperate with the TVA. If I may add just a sentence,—and that if the TVA and the people did work together, nothing could stop them.

Judge Allen: The ruling will stand."

(The witness was excused.)

[fol. 633] ROY McCULLOUGH, JR., was called as a witness on behalf of the complainants and, having been first duly sworn, was examined and testified as follows:

Direct examination:

I live in Centerville, Tennessee, and am a weekly newspaper publisher. In February, 1936, I was the editor and publisher of the Sand Mountain Banner, which is published in Albertville, Alabama.

A letter (offered and received in evidence as Complainants' Exhibit 378) was received by me through the mails from Mr. Lilienthal. I do not know whether I saved the original letter or not. I partially made search for it but was unable to find it. I had not written to Mr. Lilienthal prior to the time I received this letter.

The second sheet of the exhibit is a copy of an envelope addressed to me. I cannot say for sure that is a copy of the envelope which I received with that letter, but to the best of my recollection I believe it is. The letter was addressed, misaddressed, and it followed me to Albertville. That is why the confusion.

(The witness was excused.)

F. T. MASTIN was called as a witness on behalf of the complainants and, having been first duly sworn, was examined and testified as follows:

Direct examination:

I reside in Albertville, Alabama, and am District Manager of the Alabama Power Company. I have been employed by the Alabama Power Company 18 years. In 1934 I lived in Russellville, Alabama.

[fol. 634] In January 1934, in company with Mr. Ramsey, the Mayor of Russellville, I visited the TVA offices in Knoxville, Tennessee. When we got there, Mr. Ramsey asked for Mr. Falck and we were shown to Mr. Falck's office. Mr. Ramsey, Mr. Falck and I had a discussion there of the purchase of the Alabama Power Company's system in the City of Russellville by the City of Russellville. Mr. Ramsey told Mr. Falck he was anxious to get the TVA power in Russellville as soon as possible, and asked what he thought of purchasing the Alabama Power Company's system.

"Mr. Fly: May it please your Honor, I think this is in line with numerous other efforts to bring in numerous conversations and remarks of different subordinates of the Authority.

Judge Gore: Who was Mr. Falck?

Mr. Fly: He was an engineer, rate engineer of the Authority.

Mr. S. D. L. Jackson: Senior rate engineer of the Authority.

Judge Gore: How many rate engineers has the Authority?

Mr. Fly: There are several—there are only two.

Mr. S. D. L. Jackson: Was not Mr. Falck the senior rate engineer, Mr. Fly?

Mr. Fly: I do not know whether he was at that time or not. He might have been senior engineer.

Mr. S. D. L. Jackson: May it be stipulated, Mr. Fly, that Mr. Edward Falck is listed in your 1936 report as director of rate research, at a salary of \$5200 a year?

Mr. Fly: If it is so listed there, I will so stipulate, Mr. Jackson. He is listed as a director of rates, or a rate research man. That was 1936."

Mr. Falck replied that the systems in the so-called ceded area were worn out and antiquated. Mr. Ramsey said he knew that the system in Russellville had been completely rebuilt in the last ten years, and at the same time he repeated the first question, "Do you think we could buy the Power Company's system at a reasonable price." In sub-

stance Mr. Falck said, "Hell, you can buy it a lot cheaper if you wait awhile, when we get through with them." Some days after that I had a discussion with Mr. Ramsey and [fol. 635] Llewellyn Evans of the TVA in Russellville, Alabama. I was informed Mr. Llewellyn Evans was the chief engineer of the TVA at that time. During that conversation the question of the purchase of the system of the Alabama Power Company was discussed. Mr. Ramsey just asked Mr. Evans what he thought about buying it. Mr. Evans said, "Wait awhile", that he thought it could be bought cheaper later on. Mr. Evans did not explain why he had that opinion.

Cross-examination:

I know that in October, 1933, Mr. Ramsey had applied to the TVA for a contract for power. I did not know the exact dates, but I know he had applied. I think I stated the date of these conferences was in January, 1934. The first one was in January, 1934 at Knoxville. The second was in Russellville in March—I am not positive it was March, but it was about sixty days later. I knew that prior to those conferences the TVA had entered into a contract with the Alabama Power Company under date of January 4, 1934. I know that under that the Alabama Power Company had agreed to use all diligent efforts to sell its distribution systems in the ceded area to the municipalities. The Alabama Power Company has not sold its distribution system in Russellville to the municipality. I presume it still owns it.

(The witness was excused.)

[fol. 636] Counsel for complainants then offered in evidence from the deposition of R. Carter Pittman the examination in chief, one question and answer on cross-examination, the redirect examination and Complainants' Exhibits 380 to 389, inclusive; from the deposition of R. H. Bandy the examination in chief; from the deposition of Mrs. Nellie Armington the examination in chief, seven lines of the cross-examination and Complainants' Exhibit 390; from the deposition of Chester Gause the examination in chief and the redirect examination; from the deposition of Quincy L. Caughman the examination in chief; from the deposition of R. C. A. Kittridge the examination in chief and Complainants' Exhibits 391 to 393, inclusive; from the deposition of

A. B. Haswell the examination in chief; from the deposition of T. L. Bonner the examination in chief and Complainants' Exhibits 394 to 397, inclusive; from the deposition of J. F. Towry the examination in chief; and from the deposition of E. W. Carmack the examination in chief and Complainants' Exhibits 398 to 408, inclusive.

Counsel for defendants made certain objections to the admission in evidence of the following depositions, portions of depositions and exhibits: Pages 99 to 114 of the examination in chief of R. Carter Pittman and Complainants' Exhibits 384, 386, 387 and 388; the entire deposition of Mrs. Nellie Armington and complainants' Exhibit 390; the entire deposition of Chester Gause; the deposition of Quincy Caughman; the deposition of R. C. A. Kittridge and Complainants' Exhibits 391 to 393, inclusive; and, in connection with the deposition of E. W. Carmack Complainants' Exhibits 398 to 406.

Counsel for defendants then offered in evidence the entire cross-examination of R. H. Bandy, E. W. Carmack, A. B. [fol. 637] Haswell, T. L. Bonner and J. F. Towry; and the cross-examination of R. Carter Pittman, except pages 135 to 143 and 165 to 169, inclusive. At the same time defendants offered the depositions of R. D. Cowley and K. T. Hutchinson who had been summoned to testify before the Special Master on behalf of complainants but whose depositions had not been offered in evidence by complainants.

RULING ON QUESTIONS OF DEPOSITIONS

"Judge Allen: The Court will, at this time, rule upon the questions of the depositions. Certain depositions have been offered in evidence by the Complainants and by the defendants. The Court, in ruling upon these depositions, adheres to certain rulings heretofore made. Evidence of operation by or of competition with The Georgia Power Company is excluded, because under the injunction in force against that company, such evidence is irrelevant and immaterial to any issue in this controversy. Evidence of the speeches and pronouncements made by these subordinate officials of the Tennessee Valley Authority is immaterial and irrelevant. The Court applies these rulings, as well as

the ordinary rules of evidence, in deciding upon the admissibility of these depositions. The Court excludes the following depositions or parts thereof:

I

Upon the ground that the testimony deals solely with operations by or competition with The Georgia Power Company. (a) That part of the deposition of R. Carter Pittman, beginning at the middle of page 99, and extending to the top of page 114, and also exhibits Nos. 385 and 386, attached to said deposition. The portions of the deposition excluded are also objectionable for the reason that they offer immaterial testimony. (b) The entire deposition of R. H. Bandy.

II

Upon the ground that they relate to meetings and speeches delivered thereat: (a) The entire deposition of Mrs. Nellie Armington, together with exhibit No. 390 thereto attached. (b) The entire deposition of Chester Gause. (c) The entire deposition of Quincy Caughman. (d) The entire deposition of R. C. A. Kittridge.

The deposition of E. W. Carmack is admitted upon the ground that it presents a typical case of the organization and operation of a cooperative.

The other depositions and parts thereof, and exhibits attached thereto, including the depositions introduced by the [fol. 638] defendants taken by the complainants, if not hereby excluded, are received in evidence, subject to objections for competency. The parties may have their exceptions to this ruling.

Mr. Bemis: It is not quite clear to me, if the Court please, whether or not the depositions of the prospective witness Hutchinson and the prospective witness Cowley are admitted at this time.

Judge Allen: They are.

Mr. Bemis: If I may, I would like briefly to state the various objections which we have to this evidence, the depositions, so that the record will clearly show. I believe it appears in the record the grounds upon which the complainant makes objection.

Complainants object to the offer by defendants of the depositions of R. D. Cowley and K. T. Hutchinson as a part of

Complainants' case. In offering these depositions defendants make these prospective witnesses their own witnesses with the right thereby arising on the part of complainants to offering rebutting testimony. Therefore, the acceptance of this testimony at this time creates the anomalous situation of defendants offering evidence as a part of complainants' case in chief, thereby requiring complainants to offer rebutting evidence as a part of their own case in chief.

We further object that these depositions are inadmissible at any time for the following reasons:

1. The cross examination in each instance is entirely beyond the scope of direct examination and is thus inadmissible under the general Federal rule. Conceding for the sake of argument that the Court may, in its discretion, relax the general rule as to the scope of cross examination where witnesses are called in open court, this ruling should not be made retroactive so as to apply to depositions particularly where, as here, the witnesses are obviously hostile.

2. It is clear from all of the decisions that the scope of cross-examinations in depositions must be confined to the scope of the direct examination. Any other rule would penalize a plaintiff desiring to call an unfriendly witness for a limited purpose, and would enable a defendant to put in his defense as a part of the plaintiff case to consume the entire time allotted under the rules for taking depositions in alleged cross examination of witnesses actually partisan to the defense.

3. Where all of the testimony of a witness on direct is incompetent and irrelevant as in the case of the witness Hutchinson, the entire deposition is inadmissible under the general rule. This is not cured by its being offered by the [fol. 639] cross examiner rather than by the calling party.

4. The testimony of Hutchinson and Cowley respecting their efforts to secure electric service prior to the advent of TVA is entirely irrelevant. There is no showing in either case that at the time of the alleged request for service The Tennessee Electric Power Company could have extended its lines under the minimum requirements of any then existing tariff or commission regulation, or that there was any discrimination in refusing service, if indeed service was refused. Complainants admit that in the past there have been

such line was being built, and Mr. Beauchamp replied that he was sorry they were building that line, but that that co-operative had gotten so enthusiastic they were disregarding his instructions, and that he would see it was stopped, and thereafter it was stopped.

Judge Allen: The offer is excluded. You may have your exception."

[fol. 720] The City of Cullman has a line extending along the Bee Line Highway to Mt. Vernon Church, a distance of approximately 1.4 miles.

"Q. Was any other utility offering electric service along that route at the same time the city started that line?

Mr. Fitts: I object to that question on the ground it has nothing to do with the issues in this case, has nothing to do with the complainants, so far as I know, or with the defendants.

Judge Allen: Who is the competitor? I am asking you, Mr. Bouldin?

Mr. Bouldin: Yes, your Honor.

Judge Allen: I am asking you, who is the competitor?

Mr. Bouldin: I can just state—

Judge Allen: Is it the TVA?

Mr. Bouldin: It is the Cullman County Electric Membership Corporation.

Judge Allen: Objection sustained.

Mr. Bouldin: And we except and offer to show that there was no service along that line until the city started construction of its line. Then the Membership Corporation, a line was built and operated by the Cullman Electric Membership Corporation and is now competing with the city along that route."

(The witness was excused.)

GARY M. FREEMAN was called as a witness on behalf of the complainants and, having been first duly sworn, was examined and testified as follows:

Direct examination:

I live 6 miles from Center, Alabama, on a farm. In the spring of this year I attempted to get electric service for

my residence and applied to the Alabama Power Company for that service. I attempted to assist the Alabama Power Company in getting right of way permits for that line, and came to Chattanooga to get one of those permits from Mr. [fol. 721] Hamilton, who was acting in the capacity of purchasing agent, so he informed me, for the TVA. His office was at that time in the Pound Building. I asked him to give me a permit for the Alabama Power Company in order that its line might pass over his property to my place. This was a right of way permit involving property owned by Mr. Hamilton in his individual capacity and not by TVA. He would not give me the permit at that time, but invited me to come back and see him later. I did go back and see him later.

"Q. Tell what occurred?

Mr. Fitts: We object to that. It is not shown Hamilton was acting in an official capacity. So far as the testimony goes, he is an individual, talking to him about a line.

Mr. Bouldin: Shall I tell the Court what we expect to prove?

Judge Allen: In the first place, what land was this permit asked for?

Mr. Bouldin: Across Mr. Hamilton's land.

Judge Allen: Where is Mr. Hamilton's land, how does it affect the situation?

Mr. Bouldin: I can bring that out, your Honor. I can tell you, it lies between Mr. Freeman's land, that is his residence, and the source of power of the Alabama Power Company, that the Power Company intended to get a line across his property in order to get to Mr. Freeman's property.

I would like to state, if your Honor please, what the remainder of the testimony will be of this visit.

.

Mr. Bouldin: We expect the witness to testify that he asked Mr. Hamilton, and that Mr. Hamilton did go in and call for Mr. Morgan. Just before he got him, he called a man named Sturdevant, and he said, 'Are we going to build that line down in Cherokee County.' Of course, he could not hear what that man replied. Just as he finished that conversation, the other telephone on the desk rang. He talked over that. He said, 'Are we going to build that line down in

Cherokee? Have we got the materials for it?' Of course, he could not hear the reply. He will testify then that Mr. Hamilton hung up and said, no, he would not give the Alabama Power Company any permit, that the Alabama Power Company—

[fol. 721a] Judge Allen: Just a minute please. Objection sustained.

Mr. Bouldin: We except.

Judge Allen: The testimony offered is purely hearsay, apart from other objections. The Court will sustain the objection at this time.

[fol. 722] Mr. Bouldin: That is the last sentence, that he would not give the Alabama Power Company a permit, that the Alabama Power Company was building that line as a spite line, and that, 'We are going to build those lines in Cherokee County and you should not worry about getting service.' "

(The witness was excused.)

OFFERS IN EVIDENCE

Thereupon counsel argued the question of the admissibility of the deposition of Horatio B. Hackett, Deputy Administrator of the PWA in Washington, D. C., which deposition was to be offered by the complainants and which consisted in the identification and authentication of documents attached to the deposition as exhibits. The documents were applications to the PWA and contracts for loans and grants to municipalities in the TVA area, copies of correspondence and memoranda passing between the TVA and its officers and the PWA and its officers, dealing with those applications and contracts, and other documents relating to said applications and contracts for loans and grants for the construction of municipal electric distribution systems to distribute TVA power. Before the particular documents attached as exhibits to the deposition had been offered in evidence by the complainants, the Court ruled:

"Judge Allen: Mr. Jackson, the Court rules that the contracts are admissible. We consider that testimony as to discussion, and that sort of thing, is not admissible. Now, so far as this deposition identifies and proves the contracts,

the Court will admit it. We are stating our ruling to you so that you may understand how to proceed, and of course you may have your exception to it.

Mr. S. D. L. Jackson: Please give us an exception.

Mr. S. D. L. Jackson: Then may it be stipulated, Mr. Fly, to meet your precise point, that the exhibits attached to Colonel Hackett's deposition were each produced by him in response to a subpoena, identified and authenticated by him?

Mr. Fly: As to the contracts we will so stipulate.

[fol. 723] Mr. S. D. L. Jackson: I am asking you about the exhibits attached to the deposition, to get them authenticated. Then we will present them to the Court and make our record as to the admission, or exclusion, if any, if the Court should feel that any should be excluded.

Judge Allen: That is, all of the exhibits were authenticated?

Mr. Fly: Yes, we will concede the mere point of authenticity."

The applications to PWA by various municipalities within transmission distance of the TVA power pool, (offered and received in evidence as Complainants' Exhibits 419, 421, 423, 426, 430, 433, 436, 439, 442, 444, 451, 453, 456, 459, 467, 470, 472, 474, 476, 478, and 479), and the actual loan and grant agreements and contracts between PWA and said municipalities, (offered and received in evidence as Complainants' Exhibits 420, 422, 424, 427, 431, 432, 434, 435, 437, 438, 440, 441, 443, 445, 452, 454, 455, 458, 460, 468, 471, 473, 475, and 477), for the construction of electric distribution systems to distribute TVA power, are more particularly identified by the names of the respective municipalities and the dates of the applications or contracts as follows:

Complainants' Exhibits 419 and 420 are an application dated August 30, 1933, and a revised application for a loan and grant of \$200,000 and the contract, dated Dec. 28, 1934, of Sheffield, Alabama.

Complainants' Exhibits 421 and 422 are the application for a loan and grant and the contract of the City of Tusculumbia, Alabama.

Complainants' Exhibit 423 and 424 are the application for a loan of \$29,255 and the contract dated November 24, 1936, of Courtland, Alabama.

Complainants' Exhibits 426 and 427 are the application for a loan of \$285,000 and the contract, dated December 6, 1934, of Decatur, Alabama.

Complainants' Exhibits 430, 431 and 432 are the application for a loan and grant of \$95,500, the contract, dated October 16, 1935, and the supplemental contract, dated January 18, 1936, of the City of Hartselle, Alabama.

Complainants' Exhibits 433, 434 and 435 are the application for a loan of \$150,000 to construct a waterworks and an electric distribution system, the contract, dated October 16, 1935, and the supplemental contract dated March 16, 1936, of the town of Muscle Shoals, Alabama.

[fol. 724] Complainants' Exhibits 436, 437 and 438 are the application for a loan and grant of \$148,000, the contract and the supplemental contract, dated February 11, 1936, of the City of Russellville, Alabama.

Complainants' Exhibits 439, 440 and 441 are the application for a loan of \$190,000, the contract, dated November 2, 1935, and the contract, dated December 16, 1935, of the City of Guntersville, Alabama.

Complainants' Exhibits 442 and 443 are the original and revised applications for a loan and grant of \$184,400 and the contract, dated December 17, 1935, of Tarrant City, Alabama.

Complainants' Exhibits 444 and 445 are the original and revised applications for a loan and grant of \$636,000 and the contract, dated December 18, 1935, of Bessemer, Alabama.

Complainants' Exhibits 451 and 452 are the application for a loan and grant and the contract of the City of Starkville, Mississippi.

Complainants' Exhibits 453, 454 and 455 are the application for a loan and grant, the contract, dated November 16, 1935, and the contract, dated April 3, 1936, of the City of Okolona, Mississippi.

Complainants' Exhibits 456 and 458 are the application for a loan and grant and the contract of the City of Aberdeen, Mississippi.

Complainants' Exhibits 459 and 460 are the application and the contract, dated April 2, 1934, for a loan and grant of \$2,600,000 of the City of Knoxville, Tennessee.

Complainants' Exhibits 467 and 468 are the application for a loan and grant and the contract, dated October 29, 1936, of the City of Newbern, Tennessee.

Complainants' Exhibits 470 and 471 are the application for a loan and grant and the contract, dated December 19, 1935, of the City of Paris, Tennessee.

Complainants' Exhibits 472 and 473 are the application for a loan and grant, dated November 2, 1935, and the contract, dated June 13, 1936, of the town of Somerville, Tennessee.

Complainants' Exhibits 474 and 475 are the application for a loan and grant and the contract, dated November 24, 1936, of the City of Jackson, Tennessee.

Complainants' Exhibits 476 and 477 are the application for a loan and grant and the contract, dated December 5, 1936, of the town of Fayetteville, Tennessee.

Complainants' Exhibit 478 is the application for a loan and grant of the City of Chattanooga, Tennessee.

Complainants' Exhibit 479 is the application for a loan and grant of the City of Murfreesboro, Tennessee.

[fol. 725] Counsel for complainants offered in evidence and the Court received as Complainants' Exhibit 425 the form book called "Terms and Conditions" prepared by the PWA and incorporated by reference into each of the PWA contracts for loans and grants.

Counsel for complainants offered in evidence as Complainants' Exhibit 418 the report of the Electric Power Board of Review, a board created within the Public Works Administration to consider applications for loans and grants for the construction of electric systems, which report deals with the application for a loan and grant of \$371,743.00 by the City of Decatur, Alabama, for the purpose of constructing a distribution system including the low side of the substation and equipment. The exhibit was rejected by the Court and an exception was allowed the complainants.

Counsel for complainants offered in evidence as Complainants' Exhibit 428 a copy of the letter from the TVA to R. H. Elliott, Director of Public Works Administration, dated April 6, 1934, and as Complainants' Exhibit 429 a copy of the letter dated April 10, 1934, to David E. Lilienthal, Director and General Counsel of the TVA, from R. H. Elliott in reply to the preceding letter, both of which letters deal with the application for a loan and grant for the City of Decatur, Alabama.

Counsel for defendants objected separately to each of these exhibits on the ground that the evidence contained

in them was irrelevant and immaterial and related to the activities and actions of the Public Works Administration proceeding under a different statute. These exhibits were excluded by the Court and a separate exception to the exclusion of each of the exhibits was allowed the complainants. [fol. 725a] Counsel for complainants offered in evidence as Complainants' Exhibit 446 the memorandum from O. M. Rau, a member of the Electric Power Board of Review of the PWA to Henry T. Hunt, Deputy Administrator of the PWA; as Complainants' Exhibit 447 a copy of the letter dated August 31, 1934, from Henry T. Hunt to David E. Lilienthal; as Complainants' Exhibit 448 a copy of the letter dated September 11, 1934, from V. D. L. Robinson of TVA to Henry T. Hunt; as Complainants' Exhibit 449 a copy of the letter dated September 22, 1934, from David E. Lilienthal, Director of the TVA, to Henry T. Hunt; as Complainants' Exhibit 450 a copy of the letter dated October 8, 1934, from David E. Lilienthal of the TVA to Henry T. Hunt. Complainants' Exhibits 446, 447, 448, 449 and 450 all deal with the applications for loans and grants of Bessemer and Tarrant City, Alabama.

Counsel for defendants objected separately to each of these exhibits on the ground that the evidence contained in them was irrelevant and immaterial and related to the activities and actions of the Public Works Administration proceeding under a different statute, and on the additional ground that these exhibits involved internal details of the Public Works Administration. These exhibits were excluded by the Court and a separate exception to the exclusion of each of the exhibits was allowed the complainants.

Counsel for complainants offered in evidence as Complainants' Exhibit 461 a copy of the telegram dated February 18, 1934, from B. W. Thoren, Assistant Finance Director of PWA, to Joseph C. Swidler, Power Attorney of TVA; as Complainants' Exhibit 462 a copy of the letter dated February 16, 1934, from B. W. Thoren to Joseph C. Swidler; as Complainants' Exhibit 463 a copy of the letter dated February 17, 1934, from B. W. Thoren to Miss Owen of TVA; as Complainants' Exhibit 464 a copy of the letter dated March 8, 1934, from H. N. Waite, Deputy Administrator of the PWA, to David E. Lilienthal of the TVA; as Complainants' Exhibit 465 a copy of the letter dated March 23, 1934 from P. M. Benton, Finance Director of the PWA,

[fol. 726a] to David E. Lilienthal, Director and General Counsel of the TVA. Counsel for defendants objected separately to each of these exhibits on the ground that the evidence contained in them was irrelevant and immaterial and related to the activities and actions of the Public Works Administration proceeding under a different statute. These exhibits were excluded by the Court and a separate exception to the exclusion of each exhibit was allowed the complainants.

Counsel for complainants offered in evidence as Complainants' Exhibit 466 the excerpt from the minutes of the meeting of the Board of the Light and Water Commissioners, Memphis, Tennessee, which recites that at a meeting of the Board held on July 31, 1935, a resolution was duly [fol. 727] adopted authorizing application to be made in behalf of the Memphis Light and Water Division to the United States of America for a loan and grant in the aggregate sum of \$10,000,000 to aid in financing the construction of an electrical distribution system. This resolution waived the loan and merely applied for a grant of \$3,000,000. Counsel for complainants stated that this was the only document Colonel Hackett produced in response to complainants' subpoena duces tecum asking for the production of an application by the City of Memphis, Tennessee. Counsel for defendants objected to this exhibit on the ground that the evidence contained in it was irrelevant and immaterial and related to the activities and actions of the Public Works Administration proceeding under a different statute, and on the additional ground that it was cumulative. This exhibit was excluded by the Court and an exception was allowed the complainants.

Counsel for complainants offered in evidence as Complainants' Exhibit 469 a copy of the letter dated June 30, 1936, from David E. Lilienthal, Director of the TVA, to Kenneth Markwell, State Director of Public Works at Nashville. Counsel for defendants objected to this exhibit on the ground that the evidence contained in it was irrelevant and immaterial and related to the activities and actions of the Public Works Administration proceeding under a different statute. This exhibit was rejected by the Court and an exception was allowed the complainants.

Counsel for complainants offered in evidence as Complainants' Exhibit 480 a copy of the letter from the TVA over the signature of Joseph C. Swidler, Power Attorney of

the TVA, to K. S. Wingfield of the PWA; as Complainants' Exhibit 481 a copy of the letter dated September 22, 1933, [fol.727a] from K. S. Wingfield to Joseph C. Swidler; as Complainants' Exhibit 482 a copy of the letter dated October 24, 1934, from Henry T. Hunt, Chairman of the PWA, to V. D. L. Robinson, Administrative Assistant of the TVA. Counsel for defendants objected separately to each of these exhibits on the ground that the evidence contained in them was irrelevant and immaterial and related to the activities and actions of the Public Works Administration proceeding under a different statute. These exhibits were excluded by the Court and a separate exception to the exclusion of each exhibit was allowed the complainants.

Counsel for complainants offered in evidence as Complainants' Exhibit 483 a copy of the resolution of the Special Board of the PWA, which refers to the application of the City of Decatur, Alabama, showing the Board's approval August 15, 1934, and Presidential approval August 16, 1934. Counsel for defendants objected to this exhibit on the ground that the evidence contained in it was irrelevant and immaterial and related to the activities and actions of the Public Works Administration proceeding under a different statute, and specifically upon the ground that the exhibit dealt with internal matters of administration and the reasons and purposes of the Public Works Administration. This exhibit was excluded by the Court and an exception was allowed the complainants.

[fol.727-b] Mr. Fitts: May it please the Court, without waiving the objections to the materiality and relevancy of this evidence, but still reserving those objections and exceptions, since this other material is now in the record, we would like to offer exhibits that were produced on the cross examination of the witness Hackett:

They are in general, divided into three classifications, they are either terminations of the same contracts that were put in by Mr. Jackson, or they are new agreements, or they are amendatory agreements, relating in each case to one or more of the contracts that have been put in by Mr. Jackson.

And, Mr. Jackson, can we have the same agreement that it will not be necessary to read the cross examination, that you will stipulate that those were produced and are authentic?

Mr. S. D. L. Jackson: Certainly, the ones produced by Colonel Hackett.

Mr. Fitts: The ones produced by Colonel Hackett on cross examination.

Mr. S. D. L. Jackson: Yes."

Counsel for defendants then offered in evidence and the court received as Defendants' Exhibits 17-27, inclusive, the following documentary exhibits:

Defendants' Exhibit 17, being a waiver to be attached to the loan agreement dated April 2, 1934, between the City of Knoxville and PWA;

Defendants' Exhibit 18, being a loan and grant agreement between the City of Knoxville and PWA dated April 30, 1937;

Defendants' Exhibit 19, being an amendatory loan agreement between the City of Decatur and PWA dated May 21, 1935;

Defendants' Exhibit 20, being an agreement terminating the loan and grant agreement between the City of Decatur, Alabama, and PWA dated September 17, 1935.

"Judge Allen: It may be received.

Mr. S. D. L. Jackson: And may we save an exception. The reason for that, if your Honor please, the last record we have available shows there is still in existence a contract of loan and grant to the City of Decatur.

Judge Allen: This contract was identified?

Mr. S. D. L. Jackson: But it was produced by Colonel Hackett, no doubt about that.

[fol. 727-c] Judge Allen: Your objection goes to the weight?

Mr. S. D. L. Jackson: That is right."

Defendants Exhibit 21, being a contract between the City of Decatur and PWA dated December 7, 1935;

Defendants' Exhibit 22, being an amendatory loan agreement between the City of Tuscumbia, Alabama, and PWA dated April 2, 1935;

Defendants' Exhibit 23, being an agreement terminating the loan and grant agreement between the City of Tuscumbia, Alabama, and PWA dated February 5, 1936;

Defendants' Exhibit 24, being the contract between PWA and the City of Tuscumbia dated December 9, 1935;

Defendants' Exhibit 25, being an amendatory loan agreement between the City of Sheffield, Alabama, and PWA dated May 29, 1935;

Defendants' Exhibit 26, being an agreement terminating the loan and grant agreement between the City of Sheffield and PWA dated December 14, 1935;

Defendants' Exhibit 27, being the contract between the City of Sheffield, Alabama, and PWA dated December 6, 1935.

[fol. 728] KENNETH MARKWELL was called as a witness on behalf of the complainants, and having been first duly sworn was examined and testified as follows:

Direct examination:

I am 38 years old and live at Chattanooga, Tennessee. I am employed by the Public Works Administration and my office is in Chattanooga. I have been connected with the PWA for slightly over four years and have been in Chattanooga since November 1. My present position is that of Chief Project Engineer.

The document (offered and received in evidence as Complainants' Exhibit 484) is a list of PWA loans and grants which I believe I have seen in the central office of the Public Works Administration at Washington but I cannot positively identify it.

"Mr. S. D. L. Jackson: I might state, if the Court please, my purpose in calling Mr. Markwell and identifying this document is merely to bring the situation of the Public Works Administration's loans and grants in this territory as nearly up to date as we possibly can. If you will notice they are set up there by states on that document."

On Complainants' Exhibit 484 for identification there are nine projects listed under the State of Alabama, eight of which are under the supervision of my office. The project at Muscle Shoals, Alabama, is not under my supervision. Of the projects listed in the State of Mississippi, those at Starkville and Aberdeen are under my supervision. The project at Okolona, Mississippi, is not under my supervision. There are 15 projects listed under the State of Tennessee, 11 of which are under the supervision of my office. The

other 4 projects at Memphis, Nashville, Somerville and Knoxville, Tennessee, were completed some time ago. The other 11 projects for the State of Tennessee, the 2 projects in Mississippi and the 8 projects in the State of Alabama have not been completed and are still under construction.

[fol. 729] (The witness was excused.)

(Thereupon Senate Document 184, 74th Congress, Second Session, was offered and received in evidence as Complainants' Exhibit 485.)

L. B. LEFFERSON was called as a witness on behalf of the complainants, and having been first duly sworn was examined and testified as follows:

Direct examination:

I reside in New York City and my occupation is head of the Rate Department of Ebasco Services, Inc., which is the successor to the service organization of Electric Bond & Share Company. It performs the function of rendering advisory and technical service to the client utility operating companies in the United States and abroad which have contracted for such service.

I am a graduate of Lafayette College, with the degree of Electrical Engineer. For three years after graduation I was associated with the Lehigh Valley Light & Power Company, which was one of the several companies which have since merged to form the Pennsylvania Power & Light Company. For the first part of that three years I was in the rate department and for the last 18 months of that time I was construction engineer. Since April, 1918, I have been assistant head of the rate department of Ebasco Services, Inc. and its predecessor, and for the past four years I have been head of that department.

The functions of my department are to offer rate advisory service to our client companies. In the performance of those functions, I make frequent visits to the offices of the client companies as also do other members of my staff. The Memphis Power & Light Company, the West Tennessee Power & Light Company, the Holston River Electric Company, the Tennessee Public Service Company, the Caro-

[fol. 730] I am familiar with the rate structures and practices of those seven companies. For many years I have either personally rendered or have supervised the rendering of rate advisory service to all of these companies. In the performance of this work I have had maintained in my office in New York a complete file of the rates and rate changes of all these companies. I have consulted with the rate engineers and the executives of these companies from time to time in reference to practically every important rate change that they have made in recent years. I and other members of my staff have made frequent visits to the offices of these companies to discover the general characteristics of the business in the particular areas. I have also kept generally informed as to the rates of others operating in contiguous territory, and am familiar with the rates of the TVA as they have been publicly announced. I have made a study of what effect, if any, the completion of the TVA Unified Plan, as outlined in the report to Congress of March 31, 1936, and in subsequent hearings before Appropriation Committees, would have upon the rates of these companies.

"Q. What, in your opinion, would be the effect of the completion of the TVA unified plan and offering for sale of the power to be developed thereby under the schedules announced by the Tennessee Valley Authority upon the rates of these seven companies?

Mr. Fitts: May it please the Court, we object to that question on the ground it calls for irrelevant, immaterial evidence in this case. I might say that here is where it seems to me to lead, that if the complainants are permitted to prove, aside from all of the other grounds that have been argued here at length, if the complainants are permitted to prove that there has been a tendency for their rates to come down, then we are permitted to show all of the different reasons, possible circumstances and also I don't see why we would not be permitted to go into the valuations of their property to see whether or not their rates were reasonable and right in the first place, to show that maybe they should come down.

[fols. 731-732] It is just opening the door into the whole problem, and it is a part of a legal argument which I think we have had here, and trying to prove an ultimate issue which is itself irrelevant in this case.

.

Mr. R. T. Jackson: First I may say this, it has been conceded on the record in response to inquires from the Court that the Tennessee Valley Authority schedules for the sale of all classes of power are substantially below the corresponding schedules for the same class of power of each and all of the plaintiffs. I do not here propose to ask this witness to go into any discussion of the extent of that difference.

I want to prove through this witness the effect of that difference for two purposes: First, it is, I think, plainly relevant and material upon the question of damages, and in that connection I think we should keep in mind that we have here a suit in equity for injunctive relief, in which it is conceivable that the scope and extent of relief, if any, to which we are entitled may to some extent be affected by the comparative situation, the relative equities of the parties.

I offer this however, primarily for another purpose, and that is for the purpose of proving that we have here an unconstitutional invasion of state rights.

I want, through this testimony, to prove that the Tennessee Valley Authority Act in its operation does de facto regulate the rates of privately owned and operated utilities, within the several States in the areas in which TVA power is to be offered and made available for sale.

.

The question of whether or not there is a regulation of the complainants' rates, through the operation of the Tennessee Valley Authority Act and through its administration by these defendants, is a question of fact. Manifestly if what I have said about the character of this question is true, then any evidence which proves or tends to prove that the practical operation of this statute results in Federal regulation of intrastate rates, or even that its administration by these defendants results in Federal regulation of intrastate rates is competent and material to be received in this court.

.

[fol. 733] While it would not be material I know to this Court, the fact is that it can be presented in a very few minutes because we are not going into details. It is only the question of the effect on the situation conceded for the record, that is that we have the TVA power available at substantially lower rates than the rates of the plaintiffs and the question of whether under those circumstances the rates of the plaintiffs will in fact be measured and fixed by TVA or by the State Commissions within the constitutional power to regulate them.

Judge Allen: Mr. Jackson, the Court has had this question, the question as to the regulation of the States' rates under consideration for many days. The Court has not decided, and it has not in making this rule decided any question as to the alleged regulation of States' rates by the rates of the Tennessee Valley Authority.

The Court has assumed the existence of substantial damage to these complainants from the competition of the Tennessee Valley Authority. This is the only ultimate fact which could be established by entering in detail into the evidential facts as to rates. To go into these details would lead us into a remote and collateral inquiry which would not affect the ultimate result.

The objection is sustained and you may have your exception.

Mr. R. T. Jackson: In order to make perfectly clear what, in view of what was said in the ruling—I am afraid I have not made clear—I would like to say my purpose in offering this testimony is not to go into details, but it is to show that in fact, taking merely what is already in the record, the concession that the rates of TVA are substantially below these rates, then the rates of these plaintiffs will be regulated by TVA.

.

Judge Allen: The ultimate fact is in the record. The questions of law, of course, will be decided by the Court, and have not been decided. The Court adheres to its ruling and you may have your exception.

[fol. 734] Mr. R. T. Jackson: May we have an exception, because as we view it the ultimate facts upon which at least our argument or contention depends are not in the record.

We offer to prove through this witness the following:—
Shall I read it, if your Honor please?

Judge Allen: How many pages do you have?

Mr. R. T. Jackson: It is a little over two pages, and I will state frankly to your Honor our position is that when we are offering expert testimony we cannot reduce that to a point where it is so emasculated that it would not mean anything to a reviewing court.

Judge Allen: The Court in general agrees with you on it.

Mr. R. T. Jackson: The complainants having excepted to the ruling of the Court, now offer to show that the witness Lefferson, on the stand, if permitted to answer would say—I am omitting anything that he has already covered, which is in the record.

I have made a study of the effect of the completion of the TVA unified plan, as outlined in its report to Congress of March 31, 1936, and in the hearings on the deficiency appropriations bill of 1937, upon the rates of these companies. As a result of such studies and my familiarity with the rates of these companies I have formulated the opinion that the completion of the TVA unified plan outlined as above stated would require each of these companies to establish rates not higher than the rates at which the TVA power would be offered for sale. The maximum rates of these companies would be fixed by the level of the TVA rates.

The reasons for my opinion are that the completion of the TVA unified plan would result in the development of a large TVA grid or power pool, which in years of minimum [fol. 735] water flow and without the use of the steam electric plant at Muscle Shoals, would produce and make available for the market in the Tennessee Valley Area, 660,000 kilowatts of firm power at 100 per cent load factor, or 1,100,000 kilowatts of firm capacity at 60 per cent load factor, and a minimum of 5,780,000,000 kilowatt-hours of firm energy, and, with the use of the steam electric plant at Muscle Shoals, 6,307,000,000 kilowatt-hours of firm energy. In addition, it would result in placing on the market nearly 2,000,000,000 kilowatt-hours of secondary energy. In an average year it would make available for the market more than 10,000,000,000 kilowatt hours of energy.

The statistics of the industry show that in 1936 the entire generation of electric energy for public use, both firm and secondary, in the entire seven Tennessee Valley States, that is Tennessee, Kentucky, Mississippi, Alabama, Georgia, North Carolina and Virginia was 9,300,000,000, kilowatt hours.

The power and energy which would be produced by the TVA power pool must spread out over an area sufficient for its absorption. As the TVA markets its power in certain areas, and the existing utilities are necessarily compelled to establish rates equal to those of the TVA, there will be some division of the market between TVA power, and the power made available by existing utilities. The offering of available power by TVA at the TVA rates will have the effect of regulating the rates of the utilities downward even though some division of the market should result. The TVA power which is not marketed as a result of the retention by the utilities of a certain amount of business in any given area is available for subsequent offering in other areas. With the same regulating effect upon the rates of the utilities in the area in which it is subsequently offered.

In my judgment, the direct determination of rates through the offering of this TVA power would extend over the entire Tennessee Valley area or at least beyond the area within 150 miles from the TVA power pool. The rates of utilities within such area will be fixed by the TVA rates and not by state commissions. The availability of this vast amount of TVA power, and the probability of transmitting it to any place within 250 miles of the TVA power grid will definitely operate to regulate the rates of the private utilities to the levels of the rates at which such TVA power is made available. The uncertainty of the location of points at which TVA may choose to make this power available is in itself an effective means of regulation of the rates of the utilities in all areas within transmission distance of the TVA power grid.

Mr. R. T. Jackson: Now, I want to say further, if the Court please, that I have one other point with this witness, which I had asked the witness, as to his study of the effects [fol. 736] of the application of TVA rate schedules to these specific seven companies, which is a different question, and what I thought might come within what I have previously understood the ruling of the Court to be. I will proceed with that examination or I will make the offer

to prove on that if the Court feels it is not necessary to ask the questions.

Judge Allen: Make the offer to prove, Mr. Jackson.

Mr. R. T. Jackson: We offer to prove that this witness now on the stand, Mr. Lefferson, if permitted to testify, would further say:

I have made an extensive study of the effect upon the gross revenues of the seven companies if their rates were regulated downward to the level of the Tennessee Valley Authority rates. By application of the TVA rates to the actual power and energy sales of the seven companies for the year 1936 there is indicated a loss to these companies of electric revenues of approximately \$10,000,000 per year, or a reduction of approximately 41 per cent in their electric general business revenues."

(The witness was excused.)

FRANK A. NEWTON was called as a witness on behalf of the complainants and, having been first duly sworn, was examined and testified as follows:

Direct examination:

I reside in Summit, New Jersey, and am employed by The Commonwealth & Southern Corporation of New York as chairman of the rate committee of that Company. That Company is the service company.

I received my technical education at the College of Engineering of the University of Wisconsin. I then spent several years with the U. S. Geological Survey, surveying tunnel construction work on conservation projects and doing reclamation work in Colorado. Then I spent several years with the Railroad Commission of Wisconsin, now known as the Public Service Commission of Wisconsin. From there I went to Hodenpyle & Hardy. My work with the Railroad [fol. 737] Commission of Wisconsin had to do with rates. While I was with Hodenpyle & Hardy of New York, they were interested in financing and the operations of the companies embraced in the Commonwealth & Southern group, being power, electric, gas, street railway and inter-urban properties in Wisconsin, Indiana, Ohio, Illinois and Michigan. Upon the addition of other companies in Ohio

and Pennsylvania, that Company later became the Allied Power & Light Corporation. Subsequently, when the Southeastern Power & Light Corporation was added, the Company became known as The Commonwealth & Southern Corporation. I have been with that Company and its predecessors during that time and have been actively interested in rate matters for over 25 years and have been in charge of rates and related matters for The Commonwealth & Southern Corporation and its predecessors for nearly 20 years.

As chairman of the rate committee of The Commonwealth & Southern Corporation, I act in a supervisory capacity in rates and related matters for all of the operating companies in the Commonwealth & Southern system and have had familiarity with the rate changes made by those companies. I have been chairman of the rate committee of the Edison Electric Institute for over four years. I have been chairman of the rate committee of the American Gas Association and am now a director of that association.

I render advisory rate service to The Tennessee Electric Power Company, Alabama Power Company, Mississippi Power Company and Southern Tennessee Power Company. The latter company has no customers and no rates, it being simply a transmission company. I am familiar with the rate bases and schedules of the companies I have mentioned and have been familiar with them for The Tennessee Electric Power Company for 15 years and for the other companies for about 7 years. I acquired my familiarity from frequent visits to these companies and from continuous [fol. 738] contact with the executives of these companies on rates and related matters. I also have an office in Birmingham with a staff there which devotes its entire time to rate matters of the Southern companies.

The tabulation (offered and received in evidence as Complainants' Exhibit 486) shows the total amount of electric energy generated by the electric light and power utilities in the States of Kentucky, Virginia, North Carolina, Georgia, Alabama, Mississippi and Tennessee in the year 1936. The figures are taken from statistics compiled by the Edison Electric Institute and are generally recognized throughout the electric industry as being accurate. The total reported amount of electric energy generated by the utilities in those seven states in 1936, including both firm and secondary power, is approximately 9,300,000,000 kilo-

watt-hours. The total amount of electric energy generated by electric light and power companies in the States of Alabama, Mississippi and Tennessee during 1936 was approximately 3,730,000,000 kilowatt-hours.

The amount of energy which would be generated by the TVA Unified Plan is 5,780,000,000 kilowatt-hours of firm energy and 1,880,000,000 kilowatt-hours of secondary energy in a dry year. In a typical year there would be generated somewhere in the neighborhood of 10,000,000,000 kilowatt-hours of firm and secondary energy.

I have made a study of the effect on the rates of the utility companies in the Tennessee Valley area, which would follow from the completion of the TVA Unified Plan and the marketing of that amount of energy in the area under the TVA rate schedules.

"Q. Mr. Newton, assuming that upon the completion of the TVA Unified Plan the TVA should produce 1,100,000 kilowatts of firm energy at 60 per cent load factor and approximately 5,780,000,000 kilowatt hours of firm power annually and 1,880,000,000 kilowatt hours of secondary energy annually in a low water year, and offer it for sale in the Tennessee Valley area at rates substantially lower than those of the privately owned and operated utilities in that area, what effect, if any, would that have on the rates of the privately owned utilities operating in that area?

Mr. Fitts: We object to the question, upon the ground it calls for irrelevant and immaterial evidence and for the reasons heretofore stated.

[fol. 739] Mr. R. T. Jackson: Merely because I want to be wholly fair to the Court, I do not know that it affects it, but I invite the Court's attention to the fact that the question is phrased somewhat differently, and is phrased solely with reference to the language of the concession in the record on rates.

Judge Allen: The Court noted that.

Mr. R. T. Jackson: Not wanting to argue it, I did want to bring it to the Court's attention in case it affects the Court's ruling.

Judge Allen: Objection sustained. You may have your exception.

Mr. R. T. Jackson: An exception please.

Now, complainants offer to prove at this time that if the witness, Mr. Newton, now on the stand, were permitted

to answer the question, to which the objection has just been sustained, he would say in his answer that, under the circumstances stated in the question, the maximum rates of the plaintiffs and other utilities operating in the Tennessee Valley area and within an area larger than would be defined by a radius of 150 miles from the proposed TVA grid system or power pool, would be regulated, fixed and determined by the rates prescribed by the Tennessee Valley Authority and not by the rates fixed or determined by the State Commissions having jurisdiction.

.

Mr. R. T. Jackson: Now, without exhausting the patience of the Court I want to ask one or two more questions, which I think are clearly within the ruling, and then make my final offer to prove.

Q. A moment ago you said you had made a study of the effect upon the rates of the Utility Companies in the Tennessee Valley area which would follow from the completion of the TVA unified plan, and the offering of the power to be produced thereby for sale at TVA rates.

Will you explain in general the results of your study?

Mr. Fitts: We object to that upon the grounds previously stated.

Judge Allen: Do you expect to bring from this question testimony along the lines which you have already tried to elicit?

Mr. R. T. Jackson: I hope to do that, your Honor.

Judge Allen: Objection sustained.

Mr. R. T. Jackson: That is the purpose of the question. An exception if you please.

[fol. 740] I would like to ask two or three questions and then make one offer to prove, if I may, rather than making separate offers to prove. There is no objection, I take it.

Q. Will you please state the considerations upon which you based your opinion as to the effect upon the rates of privately-owned utilities including plaintiffs in this area.

Mr. Fitts: We object to that question on the same ground.

Judge Allen: The objection is sustained.

Mr. R. T. Jackson: Exception, please.

Q. In formulating your opinion as to the effect of the completion of the TVA unified plan, and the offering for sale of the amount of power proposed to be produced in this area at TVA rates as publicly announced, what effect, if any, did you give to the presence or absence of state regulation of rates of the competitors?

Mr. Fitts: We object to that question upon the same ground.

Judge Allen: Objection sustained.

Mr. R. T. Jackson: Exception noted, please.

The plaintiffs now offer to show that the witness on the stand, Frank A. Newton, if permitted to answer the questions to which objections have just been sustained by the court, would say:

As a result of my study of the effect upon the rates of the utility companies in the Tennessee Valley Area of the carrying out of the TVA unified plan, I am firmly of the opinion that the availability of the great volume of power generated, to be generated by the TVA will compel the utilities operating in the Tennessee Valley, and even beyond that territory, to reduce their rates to the levels of the TVA rates.

The maximum rates of such utilities in the area will be fixed and measured by TVA rates, and not by rates prescribed or established by state commissions or other state regulatory authorities.

While the power to be generated by the TVA power system will not equal in volume the total amount of power generated by the utilities in the entire area within practical transmission distance, that is within 250-mile radius of the TVA grid system or power pool, this great volume of power will flow out from the TVA power pool in constantly widening areas until it is finally absorbed.

To the extent that the TVA fails to secure the entire [fol. 741] market in the vicinity of the power pool because of the meeting of TVA rates by private utilities. It will proceed from the pool to more distant markets.

It is unnecessary that the TVA have available power in sufficient quantities to meet the entire requirements in the Valley in order to control the rates in the entire area.

Those utilities such as the ones I have mentioned particularly have rates which are uniform for similar classes of service all over their service areas. These rates have

been established by the regulatory authorities of the states wherever such regulation applies. This presents another reason for my opinion that the rates of these utilities will be controlled by the rates prescribed by the Tennessee Valley Authority.

I base my opinion that the TVA rates will control, measure, fix and determine those of the private utilities in particular upon my knowledge that for many years in the electrical industry, where there has been competition between two private utilities, or between a private utility and a municipal utility it has been almost the invariable rule that the rate levels of the two utilities become equal in all areas in which the competitive power is available, whether actually being supplied or not. I base this on my personal observation, and upon rate studies published by the Federal Power Commission.

The presence or absence of state regulation of rates of the competitors would have no effect, and in cases such as these where the state regulatory body has no jurisdiction over the rates of TVA, such regulation would have no effect whatsoever on my opinion that the Tennessee Valley Authority rates would control, measure, determine and fix those of the private utilities in the entire Tennessee Valley area.

This regulation would be effective beyond an area measured by a radius of 150 miles from the TVA grid system or power pool which would result from the completion of the TVA unified plan."

I am familiar with the rate schedules of these companies and the revenues received by the companies from rendering electric service as they exist from time to time and I am familiar with the connection which exists between the revenues and the rates for service rendered by these companies. I am familiar with the electric rates published by the TVA.

"Q. What classes of rates does the Tennessee Valley Authority have?

A. It has wholesale power rates for municipalities and [fol. 742] others which buy from it wholesale; it has power rates for power customers that it supplies directly; and it prescribes the rates which the municipalities and others which buy from it at wholesale shall sell to its customers.

Mr. Fitts: I move to strike the statement of the witness that the Tennessee Valley Authority prescribes the rates. The contracts are in evidence and speak for themselves, and that is a mere conclusion of the witness as to the effect of a contractual provision, which in my opinion, is improper. That is a legal conclusion.

Mr. R. T. Jackson: There is no dispute about it.

Mr. Fitts: There is a dispute. There is a dispute about the use of that term, a very definite dispute.

Mr. R. T. Jackson: It is in the statements to Congress that are in the record, I believe. They certainly did not mislead Congress, or at least didn't attempt to.

Judge Allen: The objection is sustained as to that part of the answer which states that the Tennessee Valley Authority prescribes the rates.

Mr. R. T. Jackson: And we may have our exception, I assume.

Judge Allen: You may have your exception."

The TVA resale rates cover the following classes of service: residential, rural, commercial and industrial power.

"Q. Are these resale rates of TVA for domestic, rural and industrial power, and rural service the same all over the TVA area?

Mr. Fitts: We object to the question as immaterial and irrelevant. It doesn't make any difference to the issues in this case whether they are same or not.

Judge Allen: Objection sustained.

Mr. R. T. Jackson: We may have our exception?

Judge Allen: You may have your exception.

Mr. R. T. Jackson: We offer to show that if the witness were permitted to answer he would say that the TVA resale rates for domestic, commercial and industrial power and rural service are the same all over the TVA area, that is, the basic standard rates are uniform, subject to certain surcharge provisions which appear in the contracts in evidence here in this case."

I have made a comparison of the rates of the Mississippi Power Company, Alabama Power Company and the Tennessee Electric Power Company with those of the TVA [fol. 743] for the same classes of service, by applying the TVA rates for the various classes to the same classes of

customers of those companies. I have applied those rates directly to the bills and the consumption of the customers in these various classes and I have made this comparison several times.

"Q. How did the TVA rates for these same classes of service compare with the same classes of service of the three companies?

Mr. Fitts: We object to that question, may it please the Court, upon the same ground.

Judge Allen: Objection sustained.

Mr. R. T. Jackson: I think if I may ask one or two questions, and make my final offer to prove, it will show it in simple form. Exception noted, please."

I have made or supervised several times a determination of the effect upon the revenues of these three companies which would follow from the making available of the substantial amount of TVA power in the service areas of these companies.

"Q. What, in general did these determinations indicate?

Mr. Fitts: We object to that question upon the same ground.

Judge Allen: Objection sustained.

Mr. R. T. Jackson: We note our exception and offer to prove that if the witness had been permitted to answer the last two questions to which the Court sustained objections he would say in substance that he has applied the TVA rates for each class of service to the bills and consumption of customers of the same service class of the three companies, that is the Alabama Power Company, the Tennessee Electric Power Company and Mississippi Power Company, and as a result, has determined that the reduction of the rates of the companies to TVA rate levels would result in a loss in revenue to these companies of between nine and ten million dollars per year."

Cross-examination:

With reference to the figure given by me as to the total amount of firm power that would be generated by the TVA Unified Plan, as I remember the statement submitted by

[fol. 744] Mr. Lilienthal, was under the heading "The Ultimate Stage of Development." That was with the installation of whatever generators were stated in the table. I do not recall whether Fontana was in the table or not, but it includes all installation that was stated in that table. I do not know how many generators are now installed in the various dams or for how many generators there has been an actual appropriation or authorization by the Board of Directors of the TVA. I could not give any figures as the amount that could be generated by the use of the generators installed or authorized for installation.

To the extent that the power companies secure power from interconnections with companies in other states, it is necessary to consider the capacities in those other states to get a true picture of the capacities available on the various systems. The figures are what I have stated. The total generation of power in the various other states for the year 1936 is as follows: Arkansas, 140,238,000; Missouri, 1,466,000,000; Illinois, 7,755,000,000; Indiana, 3,387,000,000; Ohio, 7,612,000,000; West Virginia, 2,616,000,000.

Redirect examination:

I do not know how much, if any, power comes into the seven states from any other states or how much goes out.

Recross-examination:

I do not recollect whether at least parts of all those states which I have mentioned are included within 250 miles of one of these dams.

(The witness was excused.)

[fol. 745] HARRY M. ADDINSELL was called as a witness on behalf of the complainants and, having been first duly sworn, was examined and testified as follows:

Direct examination:

I reside in Glen Cove, New York, and am in the investment banking business. I entered the old firm of M. W. Harris & Company in 1905 and continued with their successors, Harris, Forbes & Company, of which I became Vice President and Director, until 1931, when it was changed to

Chase, Harris, Forbes Corporation, of which I was President and Director. Since the spring of 1934, I have been chairman of the executive Committee of the First Boston Corporation. My office is in New York City.

In our annual report to stockholders for the year 1936, we stated that we had participated in marketing or in syndicates involving \$3,900,000,000, of which our direct underwriting interest was some \$318,000,000. Our house was a leading banker in getting a number of these issues. We majored in bonds and the larger part of our business has been in public utility bonds. I know the names of the companies which are complainants in this case. Harris, Forbes Company has participated in underwriting for the Appalachian Electric Power Company, the Birmingham Electric Company, the Memphis Power & Light Company and the Mississippi Power & Light Company, and the First Boston Corporation participated in the underwriting of the Tennessee Public Service Company, the Carolina Power & Light Company and the Mississippi Power & Light Company.

"Judge Allen: Mr. Jackson, the Court is wondering whether the testimony of this witness will be directed to the same points that were elicited from Mr. Frothingham."

Mr. R. T. Jackson: Not quite, your Honor, I do not think. It will not be an offer to prove, but I will briefly explain to your Honor what the testimony is.

Judge Martin: We thought if it was cumulative, you might state about what the witness would prove. I do not mean an offer to prove.

"[fol. 746] Mr. R. T. Jackson: I believe he can state it more quickly than I can. It will not take but a few minutes.

Mr. O'Brian: If the Court please, I desire to interpose the objection, I think the purpose of the testimony is quite clear, that it must fall in either of two theories, the first theory, the witness is offered to undertake to testify to specific companies, the Tennessee Electric Power Company, I believe. In that case it would fall in that ruling, and if not it would fall in the ruling it would be cumulative, because this is relating to general conditions as distinguished from one or two particular companies and was covered by Mr. Frothingham. I desire to interpose the objection at

this time to further questioning on the ground it is irrelevant and immaterial.

Mr. R. T. Jackson: I think when the questions are asked Mr. O'Brian will regret he has been misled into making the objection that he has made.

(By Mr. R. T. Jackson:) I want to invite your attention to the Alabama Power Company, the Appalachian Electric Power Company, the Birmingham Electric Company, the Carolina Power & Light Company, the Memphis Power & Light Company, the Mississippi Power & Light Company, the Tennessee Public Service Company, the Tennessee Electric Power Company, and ask you to state if you know whether or not each of these companies had an established credit in the money market prior to 1933?

Mr. O'Brian: To that I object as irrelevant and immaterial, and as a matter incompetent, for this witness to deal with the established credit of any particular complainant in this case.

The purpose of the question is in relation to some opinion of the witness, that he may choose to express. I understood the Court in ruling upon Mr. Frothingham's testimony, to confine it to his own opinion and not as to the attitude of the investment market. I understood that to be the Court's ruling, upon which the narrow permission was given to obtain his opinion.

Mr. R. T. Jackson: This is the opinion of this witness and it deals specifically with these companies, with a specific asset of the company.

Judge Allen: Objection sustained.

Mr. R. T. Jackson: Exception noted. We offer to show if the witness were permitted to answer the question, he would say that each of these companies had an established credit in the money market in 1933. And in view of the fact there was an objection made that the witness was not competent to express an opinion, I want to ask the Court if they will indulge me by stating whether their ruling is in any manner based upon that? Because, if this witness is not competent, Mr. O'Brian will never be able to find one.

[fol. 747] Judge Allen: That was not the basis of the Court's ruling.

By Mr. R. T. Jackson:

Q. In your opinion was that an asset of the various companies?

Mr. O'Brian: Object to that.

Judge Allen: Objection sustained.

Mr. R. T. Jackson: We note an exception and offer to prove if the witness were permitted to answer, he would say that this established credit was an asset of very substantial value to each of them, and would enable them to secure funds with which to build additions, and meet the growth of their business.

By Mr. R. T. Jackson:

Q. Mr. Addinsell, in your opinion has there been any change in the character and extent of that established credit of the named companies, or any of them since 1933?

Mr. O'Brian: To that I object on the same ground, also on the ground it is cumulative.

Judge Allen: Objection sustained. You may have your exception.

Mr. R. T. Jackson: That is the ruling of the Court, as I understand, is based upon the circumstance that two witnesses cannot express an opinion in the same field.

Judge Allen: It is based upon the proposition that the questions that preceded it were objectionable.

The Court had some doubt of the relevancy and materiality of the testimony of Mr. Frothingham, and he gave opinion testimony covering general conditions. The court ruled out the testimony of the banker,—I forget his name—with reference to investments of a specific company.

Judge Martin: The Nashville banker.

Mr. R. T. Jackson: I would like the record to show the purpose of offering this testimony is both on the issue of damages, to show their nature, type and extent also upon the question of invasion of states' rights and direct interference with the power of states to regulate their local utilities. But, I assume that makes no difference in the ruling of the Court. And I want to show clearly in the record that it is offered for both purposes.

Judge Allen: Objection sustained. You may have your exception.

Mr. R. T. Jackson: We offer to show if the witness [fol. 748] were permitted to answer the question propounded to him, he would say the established credit of each of the complainants has diminished materially since 1933.

By Mr. R. T. Jackson:

Q. Will you please give your opinion of the extent to which the credit of these companies has diminished since 1933?

Mr. O'Brian: To that I object on the same ground.

Judge Allen: Objection sustained.

Mr. R. T. Jackson: I note an exception. We offer to show that if this witness were permitted to answer the question he would say that the established credit of each of these companies has diminished to the extent that, with the possible exception of the Appalachian Electric Power Company, each would be unable to do any substantial financing, except at rates which would be exorbitant.

By Mr. R. T. Jackson:

Q. Mr. Addinsell, have you given consideration to the cause or causes of the impairment of the established credit of these companies?

Mr. O'Brian: I object to that on the same grounds.

Judge Allen: Sustained.

Mr. R. T. Jackson: Note an exception.

We offer to show that the witness would answer that he has given consideration to that factor.

By Mr. R. T. Jackson:

Q. Mr. Addinsell, will you please state briefly the results of that consideration?

Mr. O'Brian: I object to that on the same ground.

Judge Allen: Objection sustained.

Mr. R. T. Jackson: We note an exception and offer to show that if the witness were permitted to answer the question he would say from his own observation of the securities of these companies and the financial results of their operations; and also of the situations in which they operate, he has definitely become of opinion that the cause of the im-

pairment of the established credit of these companies is the threat of destructive competition of the Tennessee Valley Authority which confronts these companies.

By Mr. R. T. Jackson:

Q. Mr. Addinsell, has this impairment of the established credit of these companies been occasioned by the change in the financial condition of these companies, or the position of—

Mr. O'Brian: To that I object on the grounds previously stated.

[fol. 749] Judge Allen: Objection sustained.

Mr. R. T. Jackson: We note an exception. We offer to prove the witness, if permitted to answer, would say that the impairment of the established credit of these companies has not been occasioned by any change in their financial condition; that the coverage of fixed charges of the companies mentioned has improved from 1933 to 1936, within the average of light and power companies generally within the United States, and there have been no other changes in the physical conditions of the companies which might account for the lowered prices of their bonds. And there was no change in the earnings which would account for the impairment of the established credit.

By Mr. R. T. Jackson:

Q. Mr. Addinsell, would the fact that the Federal Trade Commission had alleged that a write-up had occurred in the fixed capital account of any of these companies, in your opinion, bring about a change in the established credit?

Mr. O'Brian: To that I object, to the extent of the witness' opinion.

Judge Allen: Objection sustained.

Mr. R. T. Jackson: We note an exception. We offer to show that this witness, if permitted to testify would say that the existence of alleged write-ups, or the charge of alleged write-ups by the Federal Power Commission, the charge of write-up in fixed capital account of any of these companies would not bring about this change in established credit with investment bankers.

That investment bankers to a large extent provide the market for these companies, and similar companies. That

they make their own investigation for the basis for the issuance of the bonds, and do not give much weight and study to book values of fixed capital items."

The charts, (offered in evidence as Complainants' Exhibits 487 to 496, inclusive), are designed to show the fluctuation in price, interpreted in terms of yield because of the variations in base rate, maturity, etc. of the different bonds involved of the 9 complainant companies with Standard Statistics Company's average yields of public utility bonds by quality groups beginning with A-1 rating, and running down to the B-1 rating. Complainants' Exhibit 487 is a chart comparing the composite graph of the 9 companies as compared with the background of fluctuations and interest yield on various grades of bonds. The subsequent exhibits, Complainants' Exhibits 488 to 496, show the variations in change of the separate 9 companies as compared with the [fol. 750] same background of fluctuations and interest yield on various grades of bonds. These charts were made up under my direction and I obtained the data from the Standard Statistics. Standard Statistics, as pretty nearly everybody knows, is possibly the largest statistical agency for the dissemination of analyses of securities, and their rating and financial reports of various characteristics with regard to the companies whose securities are in the market. It also publishes from month to month a book in which those ratings and quotations are revised from time to time. The definition of the different ratings as shown in their book are the A-1 bonds, or the high grade bonds; A bonds are sound; B-1 plus bonds are good; B-1 bonds are fair. The B-1 plus bonds and those which are better are bonds which are generally acceptable for bank investment. Standard Statistics' services go all over the country to banks, insurance companies, dealers, investment dealers, investors, etc. It is generally accepted in the investment banking business as one of the most reliable, if not the most reliable of statistical agencies.

"Mr. R. T. Jackson: We offer in evidence exhibits 487 to 496, inclusive.

Mr. O'Brian: If the Court please, we object to the receipt of any and all of these exhibits. The comparison shown would be meaningless so far as the issues in this case are concerned, because the witness has testified that this is

based upon market prices of these bonds at various times as indicated on the exhibit.

And the Court may take judicial notice of the factors which affect fluctuations in the price, market price of securities from day to day or from month to month.

Furthermore, this is simply a comparison with the average yield of utility bonds of companies apparently all over the United States, many of which must have very different conditions of operation from those of the nine companies shown here.

The legend reads that it is a comparison with the Standard Statistics Company's average yields of public utility bonds by quality groups.

[fol. 750-a] Now, to ascertain whether that would be a fair basis of comparison would involve our looking into the conditions of the other companies. It is not a comparison with a neighboring company. It is not a comparison with utilities claimed to be operating under identical conditions in the same market.

This is a comparison with an average, an average yield of the entire United States, including for example such companies as the Consolidated Edison in the highly populated vicinity of New York City, including other companies of very slight moment, and the basis of comparison would be entirely a matter of opinion in that degree, and I therefore object to the receipt of these as involving elements of speculation, remoteness, and being immaterial and irrelevant to the issue here.

The Court has already excluded the opinion of this witness as to the cause of any discrepancy in price between these bonds and other general utility bonds.

For all of those reasons I object to the receipt in evidence of these charts.

Judge Allen: The objection is sustained and complainants' exhibits from 487 to 496, both inclusive, are excluded.

Mr. R. T. Jackson: I take an exception and ask one or two more questions, because among the numerous statements of objection there are some that might go to the technical qualification of the exhibit and I want to cover those.

Q. Will you explain how, without giving the results, the comparison is made between the average, is made between the nine complainant companies, or each of the individual companies, on the exhibit, following 487, and the B-1 and

other ratings that are shown on these exhibits, and whether or not there is any shift in the basis of comparison between the period shown at the beginning on the left hand side of the chart and the period on the right hand side?

[fol. 751] A. But the curve shows for example, the red line showing the average of the nine companies shows that the bonds of these companies sold at a lower interest rate, and therefore theoretically higher price than bonds having an A rating. That begins at the beginning—

Mr. O'Brian: Is this going into the record?

Mr. R. T. Jackson: Certainly.

Mr. O'Brian: If so, I want to object to it.

Mr. R. T. Jackson: I think he is entitled to explain how it is made up.

Mr. Fitts: He is testifying as to the facts.

Mr. O'Brian: I ask to have the answer stricken.

Judge Allen: The objection is sustained.

Mr. R. T. Jackson: I don't see how otherwise he can qualify it.

Judge Allen: The objection is sustained and the answer will be stricken from the record.

Mr. R. T. Jackson: May an exception be noted, please? I think I noted an exception severally to the rejection of each of the exhibits. I don't know whether this is really a proper question in view of the ruling of the Court, but I will state the question to make the record clear.

Q. In connection with an offer of proof, Mr. Addinsell, it was stated that you would testify that with the possible exception of the Appalachian Electric Power Company these companies which have been named would be unable to do any substantial financing except at probably exorbitant rates.

I now ask you whether you will explain your reference to the Appalachian Electric Power Company in this connection?

Mr. O'Brian: To that I object as irrelevant.

Judge Allen: Objection sustained.

Mr. R. T. Jackson: Note an exception. And we offer to show that if the witness were permitted to answer he would say that the effect of threat of TVA competition has varying degrees of intensity; the larger part of the property of the Appalachian Electric Power Company being located at a

greater distance from the center of the TVA activities than any of the other complainant companies, and is in a region where cheap coal is available, and that according to his information no TVA transmission line has been projected into the company's territory.

[fol.752] Q. Mr. Addinsell, has this impairment—with one or two more questions to complete the record, your Honor—has this impairment of the established credit of the companies in your opinion resulted in pecuniary loss to the companies mentioned?

Mr. O'Brian: To that I object.

Judge Allen: Objection sustained.

Mr. R. T. Jackson: We take an exception and offer to show that if the witness were permitted to answer he would say that it has caused a pecuniary loss to the companies mentioned in the sense that if this credit impairment had not arisen, in his opinion these companies could have re-funded and brought about an annual savings to the companies of more than \$2,000,000.

Q. Mr. Addinsell, in forming your opinion of the impairment of the credit of these companies, have you taken into consideration all factors which are usually taken into consideration by you as an investment banker in determining the quality of the security?

Mr. O'Brian: To that we object as immaterial.

Judge Allen: The objection is sustained.

Mr. R. T. Jackson: And we note an exception and offer to show that the witness if permitted to answer would say he has taken into consideration all factors which he ordinarily would take into consideration as an investment banker."

(The witness was excused.)

BARNEY E. EATON was called as a witness on behalf of the complainants and, having been first duly sworn, was examined and testified as follows:

Direct examination:

I am 59 years old and living in Gulfport, Mississippi, and am president and general counsel of the Mississippi Power Company.

"Q. Mr. Eaton, were you present when the Judiciary Committee of the House of Representatives and the Senate of the State of Mississippi conducted hearings on a series of utility bills in March of 1936?

[fol. 753] Mr. Fitts: May it please the Court, we object to that question as calling for immaterial and irrelevant testimony. It can lead only to an attempt here to prove what has gone on in state legislatures, passage of bills, purely political in nature. If we are going to try a political controversy here, as to the reasons for the legislature passing legislation, we can be here several years.

Mr. Bemis: If the Court please, I think it would simplify the record and the procedure here if these preliminary questions would be permitted to be answered, and then we make very brief offers.

Judge Allen: Let's find out about this hearing. Where was it held?

The Witness: The State Capitol at Jackson, Mississippi.

Judge Allen: Was the hearing upon a proposed enactment, to be enacted by the Legislature of Mississippi?

Mr. Bemis: Yes. It was a hearing relating to certain enabling acts to permit rural cooperative associations and municipalities to contract with the Tennessee Valley Authority and REA and other Federal agencies; and the bills in question were bills which had been prepared, as we expect to show, by the Tennessee Valley Authority counsel in collaboration with counsel representing the other agencies.

Judge Allen: Were the bills enacted?

Mr. Bemis: And the bills were in fact enacted.

Judge Allen: Objection sustained. The Court will permit you to show that such a statute was enacted, and to prove the statute. The Court will not receive testimony as to what was said at hearings, preceding the enactment of such legislation.

Mr. Bemis: An exception. And we would like to have the record show that our purpose is to show the activities of the defendants in promoting the legislation, preparing, sponsoring and supporting legislation in the promotion of its electric power business, and in its promotion of its activities in disposing of its power through its transmission and distribution system.

Judge Allen: The Supreme Court of the United States has held that the motives of the legislature cannot be inquired into, even if they were bribed. That is a pretty

drastic holding, but we think that it has great point here. For that reason, we will not inquire into the motives which led up to the enactment of legislation.

Mr. Bemis: If the Court please, I am not seeking to prove motives.

[fol. 754] Judge Allen: You may have your exception. The ruling stands. Now, from time to time the Court says with some emphasis that "the ruling stands" because we are trying to get this ox out of the ditch.

Mr. Bemis: We take our exception, if the Court please, and we offer to show that the witness if permitted to answer would state in response to appropriate questions that he was present at a meeting of the Judiciary Committee of the House of Representatives and Senate of the State of Mississippi in March of 1936, that Mr. C. G. Davidson, an attorney for the Tennessee Valley Authority was present at that committee hearing, that Mr. Davidson stated that he had been assigned by the Tennessee Valley Authority to urge the enactment of the pending bills, and gave two reasons for their enactment, that the rates of the private utilities in Mississippi were exorbitant, and that the Tennessee Valley Authority rates and service would both result in great savings to the consumers of electricity, and induce the location of new industries, that the Federal Government had made an appropriation of \$420,000,000 for rural electrification, that the attorneys in Washington representing the Tennessee Valley Authority, the PWA, and REA had jointly proposed these bills, and that if they were passed Mississippi would be able to secure the advantages of Tennessee Valley Authority rates and service, and participate in the allotment of REA funds.

And the witness would testify further that in the hearings before the Senate Committee in addition to Mr. Davidson, Mr. Dennis Murphree also appeared, Mr. Murphree being the coordinator of Federal agencies in Mississippi, and that Mr. Murphree also supported this legislation.

Now, in order to identify the legislation which was before the Legislature, we would like to, for the convenience of the Court, have identified the particular bills which were in fact passed at this session of the Mississippi Legislature. (By agreement of counsel the following was inserted in the record at this point): Let the record further show that the bills under consideration at this hearing before the Judiciary Committees referred to in the offer to prove are as follows:

House bill No. 575, later enacted as Chapter 183, laws 1936 of Mississippi; House bill No. 578, later enacted as Chapter 184, laws 1936, of Mississippi; House bill No. 577, later enacted as Chapter 185, laws 1936, of Mississippi; House bill No. 576, later enacted as Chapter 187, laws 1936 of Mississippi; House bill No. 579, later enacted as Chapter 271, laws 1936 of Mississippi. All the above acts were approved March 26, 1936."

(The witness was excused.)

[fol. 755] REQUEST FOR SUBPOENA DUCES TECUM

Counsel for complainants then requested the Court to issue a subpoena duces tecum (marked for identification Complainants' Exhibit 497), requiring for the production of the copy of the telegram dated between January 1 and January 15, 1935, sent from the TVA to the Governor of Alabama, stating the terms and provisions of a proposed statute to be submitted to the legislature of Alabama.

"Mr. Fitts: We object to the granting of that order upon the ground stated before, that the evidence, if produced, would be entirely immaterial and irrelevant, and the Court is not called upon to issue a subpoena for immaterial evidence.

Mr. S. D. L. Jackson: As I understood it, you said we might show the statute. I take it that is the one that is presented to the Legislature.

Judge Allen: You can show the statute which has been enacted. When I speak of a statute I——

Mr. S. D. L. Jackson: Might we not show the bill that is introduced in the Legislature?

Judge Allen: Speaking for this member of the Court, you may not. That is my single ruling now. The matter will be taken under advisement.

Judge Martin: I concur in that ruling, so it is the ruling of the Court now. Further than that, as far as the statute of Mississippi is concerned, which was enacted in the law, isn't it a fact that this Court takes judicial notice of that statute? It is not necessary to prove the statute of a state in the United States Court. You may merely point to the statute so that the Court can consult the statute, and of course, consider it.

But it is my understanding that it is not necessary in the United States Court to prove a statute, law or state statute.

Mr. S. D. L. Jackson: That is my understanding that the Court does take judicial notice of state statutes that are enacted. I might state the purpose of this, and as I understood your Honor's ruling, we might show what was presented to the State Legislature. I also submit if it was presented directly by TVA, we might show that fact as I understood it.

Judge Allen: That was not what was said, according to the words of the ruling. Neither was it the meaning of it. You are entitled to show the statute, whether it be proven or whether judicial notice be taken of it, you are entitled to show the statute. The Court considers and has ruled that you are not entitled to show the negotiations, speeches, telegrams, letters, conferences, picnics and other gatherings which preceded it.

[fol. 756] Mr. S. D. L. Jackson: If the Court please, it was not my intention to try to go into any of those matters. But we do earnestly desire, it is in our bill, to show the lobbying, and as I honestly understood your Honor's ruling it would permit us to have this particular telegram produced. Now, if I have been under a misapprehension I must apologize.

Judge Allen: That was not the meaning of the ruling at all, Mr. Jackson, and that is not the words of the ruling, and we do not feel that this is covered by the ruling. But irrespective of that, this particular demand simply comes under the heading which we have ruled out.

Mr. S. D. L. Jackson: Well, now, if that telegram does state or set forth verbatim a bill that was introduced in the Alabama Legislature, which was subsequently enacted into law by the Legislature of Alabama, it would certainly seem to me that even under the Court's prior rulings we would be entitled to it.

Judge Allen: Taking your statement at its full face value, Mr. Jackson, the Court considers that evidence immaterial, because if the act of a responsible State Legislature intervenes it makes no difference, this Court cannot inquire into the motives which induced the Legislature to enact a statute.

Mr. S. D. L. Jackson: This doesn't go into that.

Judge Allen: That is not the subject of judicial inquiry.

Mr. S. D. L. Jackson: We are not seeking to inquire into

the motives of the Alabama Legislature, we are seeking to show the activities of the TVA.

Judge Allen: The Court cannot, in these offers, for this purpose,—this Court cannot inquire into the persons who suggested statutes. It is immaterial. It has nothing to do with this controversy in the view of the Court.

Mr. S. D. L. Jackson: May we have an exception to your Honor's ruling?

Judge Allen: You may have an exception."

[fol. 757] HOMER TOWNSEND HARLE was called as a witness on behalf of the complainants and, having been first duly sworn, was examined and testified as follows:

Direct examination:

I reside in Cleveland, Tennessee, and am Secretary-Treasurer of the Cherokee Hosiery Mill. I attended a meeting of the Southwest Tennessee Membership Corporation about December 5, 1936, held in the City Hall in Jackson, Tennessee. Mr. Wall and Mr. Halsey of the TVA were in charge of the meeting.

Examination by the Court:

The meeting was not in progress when I went there. The meeting was called to order by Mr. Wall.

"Mr. Fitts: Is that what you mean when you say that Mr. Wall was in charge of the meeting, that it was called to order by Mr. Wall:

The Witness: That is right."

Direct examination continued:

I believe his full name is Earl R. Wall. He was District Manager of the TVA in Jackson. Mr. Halsey's full name is William Halsey and he was commercial Manager of the TVA in Jackson. Mr. Wall stated that the Southwest Tennessee Membership Corporation had approximately 1,000 members signed up from Madison, Haywood and Tipton Counties. He also stated that the REA had agreed to furnish \$290,000 for the construction of TVA lines in those Counties, but he stated that not one pole could be sunk or

one line constructed until the members were signed up 100 per cent.

[fol. 757a] "Mr. Fitts: I would like to see the written paper when you finish, that you are testifying from.

The Witness: All right."

Mr. Wall stated that since the 1937 model electric appliances had not come on the market yet, he would accept [fol. 758] papers leaving the name of the appliance and the cash value of the appliance blank, but it must be filled in with the dealer's name from whom the consumer proposed to purchase the appliances, which we would install in his home, and that they must also have signed contracts from electrical contractors to provide wiring for their homes. Mr. Brock, who is the County Agent for Madison County, stated he would be able to see each one of these members the next week in his official rounds and proposed that there be a meeting held in each community as he went around, and that the dealers of Jackson and the surrounding towns and counties accompany him on these rounds and converse with the rural applicants for electrification, and try to sign them up for electric appliances to be installed in their homes. This was discussed at some length by the members and by Mr. Wall and Mr. Halsey, who answered questions from the members as they were asked, and it was finally agreed that Mr. Halsey would go out and have a meeting in each one of the communities, would present the proposition to them and that two days later Mr. Brock, the County Agent for Madison County, would take all of the dealers in Jackson or any other electrical dealers from Memphis or surrounding towns or counties that wished to accompany him, and that they would then attempt to sign up each member of the Southwest Tennessee Membership Corporation 100 per cent for house wiring and for the electric appliances which they had agreed to install.

"Q. All right. Now, Mr. Harle, Mr. Fitts has asked you about some memorandum to which you have been referring. Is that a memorandum which was prepared by you?

A. Yes, I wrote this myself.

Q. Can you state at what time you prepared the memorandum?

A. Yes, I wrote it on the same day that I attended the meeting."

[fol. 759] Cross-examination:

This was the Southwest Tennessee Electric Membership Corporation./ Mr. Wall stated that it had approximately 1,000 members signed up at the time of the meeting. I could not say whether any of those people did have electric service from any of these complainant companies before. I happened to be at that meeting as I was living in Jackson at that time. Mr. Wisdom of the West Tennessee Power & Light Company asked me to attend the meeting and at his request I made that memorandum.

(The witness was excused.)

[fol. 760] CHARLES C. McWHORTER was called as a witness on behalf of the complainants and, having been first duly sworn, was examined and testified as follows:

Direct examination:

My residence is in Moulton, Lawrence County, Alabama, and I am in the banking business. I have been city clerk of Moulton since 1932 and am also a councilman.

The resolution, (offered in evidence as Complainants' Exhibit 498), was brought to my office in the Bank of Moulton by Mr. Spencer Latham, who was an employee of the TVA at that time. Mr. Latham's activities, so far as I knew, seemed to be out among the people of the rural districts lining them up for TVA power. I do not know exactly what his real duties were or what his title was. He drove a car with a TVA license tag.

"Q. What did Mr. Latham ask you to do with that resolution, if anything?"

Mr. Fitts: We object.

Judge Allen: Was this resolution passed?

The Witness: Yes, ma'am.

Mr. Fitts: It seems to me anything that happened prior to its passage is incompetent.

The Witness: It was not passed in a regular session.

Judge Allen: Objection sustained. The Court considers that resolutions or ordinances of the councils of towns or

municipalities are of the same class as statutes of a legislature. They are enactments of a legislative body, and the Court will not hear testimony as to how they were induced to be passed, or who suggested them, or as to the discussion in connection with them. You may have your exception.

Mr. Bouldin: We except. We offer to show, your Honor, that Mr. Latham requested Mr. McWhorter to sign the resolution. Mr. McWhorter did sign the resolution. Mr. Latham then took the resolution from his office and that the witness does not know thereafter what became of the resolution. May I ask the Court this question? Would it change the Court's action if we could show there was no passage of the resolution at a convened meeting of the city council?

[fol. 761] Judge Allen: It would not change the Court's ruling.

Mr. Bouldin: That is all, I have said that is all. May I offer this exhibit, your Honor.

Judge Allen: Complainant's Exhibit 498 is excluded.

Mr. Bouldin: We except."

Cross-examination:

The Alabama Power Company sells power to the Town of Moulton and the Town of Moulton does not have any contract with the TVA or with the Joe Wheeler Electric Membership Corporation. Moulton is in Lawrence County, but I do not know whether that is in the ceded area under the contract of January 4, 1934. The TVA owns the transmission line that serves the Town of Moulton. I think the Alabama Power Company owns the sub-station, but I am not certain.

(The witness was excused.)

L. W. GENTRY was called as a witness on behalf of the complainants and, having been first duly sworn, was examined and testified as follows:

Direct examination:

I reside in Moulton, Alabama, and am a banker. I am a director of the Joe Wheeler Membership Corporation. The TVA built some of the electric distribution lines of

the Joe Wheeler Membership Corporation. I do not know whether they built them all or not. The Joe Wheeler Membership Corporation now operates the lines built by the TVA. I do not think the Joe Wheeler Membership Corporation advanced any funds to the TVA for the construction of the lines, but I think it took them over and contracted with TVA to pay for them. The Joe Wheeler Membership Corporation has not advanced any cash that I know of.

(The witness was excused.)

[fol. 762] ROY A. SMITH was called as a witness on behalf of the complainants and, having been first duly sworn, was examined and testified as follows:

Direct examination:

For 14 years I was City Clerk of the City of Athens, Alabama, and I left that employment in October, 1936. During the time I was City Clerk of Athens, the City of Athens made a contract with the TVA. Prior to the date of that contract, the electric distribution system in Athens had been owned by the City. It was my duty to render electric bills, to collect them and to purchase material for the electric plant of the City and I kept the books. I was Clerk of the City Council of Athens.

After the TVA contract, the bookkeeping of the light plant was segregated from the water plant. It had previously been connected with the water plant. The receipts from the light plant were also kept separate. As to what, if any, supervision or auditing occurred with respect to the bookkeeping of the light plant after the TVA contract, the books were kept as before but TVA had auditors to audit the books. There was a general audit every twelve months and there were men there oftener than that. I would say they were there about one-fourth of the time.

"Q. Prior or at the time this segregation was made, was there any dispute between the TVA and the City of Athens concerning the valuation to be placed upon the electric properties?

Mr. Fitts: We object to that, may it please the court. It is impossible for us to see how the dealings on a matter of

that kind between the Tennessee Valley Authority and the City of Athens, where the Tennessee Valley Authority is selling to the municipal system, can have any bearing on the issues in this suit.

Judge Allen: Objection sustained.

Mr. S. D. L. Jackson: Exception. If the witness were [fol. 763] permitted to answer he would state that the city council of the city of Athens valued its electric properties at something in excess of \$100,000; that immediately after the contract was made with TVA, the TVA engineers caused an appraisal to be made and refused to permit a valuation for the property to be set up on the books in excess of \$72,000.

By Mr. S. D. L. Jackson:

Q. With respect to the operations of the electric property after the TVA contract, Mr. Smith, was there any set place as between the water and the light, which had produced the greater revenue?

Mr. Fitts: We object to that question, may it please the Court, on the ground it is irrelevant and immaterial.

Judge Allen: Objection sustained.

Mr. S. D. L. Jackson: Exception. And if the witness were permitted to answer he would state that the revenues from the electric end of the business were about three times those from the water operations of the city.

By Mr. S. D. L. Jackson:

Q. With respect to the charges for operations, Mr. Smith, will you state please, whether there was any disagreement between the city council of the city of Athens, and the Tennessee Valley Authority as to the amount of charges that should be made to operations of the electric part?

Mr. Fitts: We object to that, may it please the Court, as irrelevant and immaterial.

Judge Allen: Objection sustained.

Mr. S. D. L. Jackson: Exception. And if the witness were permitted to answer, he would state that the City Council of the City of Athens were convinced that something over two thirds of the total cost of operation of the water and light service should be charged to the electric

properties, but that the Tennessee Valley Authority refused to permit more than approximately 50 per cent of the charges for operations to be so charged.

Judge Allen: The contract between the city and the TVA, was one of those introduced this morning?

Mr. S. D. L. Jackson: This morning?

Judge Allen: Yes.

Mr. S. D. L. Jackson: No, if your Honor please. I think that the contract between the TVA and the city was introduced some time ago. Those were PWA contracts this morning.

[fol. 764] Judge Allen: Yes, that is true.

Mr. Fitts: The contract is in evidence, though.

Judge Allen: The contract is in evidence. The contract provides, I presume, for resale rates?

Mr. Fitts: It does. It contains the provision as to certain supervision over the method of bookkeeping and auditing.

By Mr. S. D. L. Jackson:

Q. Did the Tennessee Valley Authority, Mr. Smith, ever render the city of Athens a bill for the appraisal of the property that was made, or for any of the auditing supervision that took place while you were city clerk?

Mr. Fitts: We object to that, may it please the Court, — immaterial and irrelevant. It can only go to a question which involves the question of whether or not the rates that are charged by the city of Athens took into account what the complainants claim are all the elements of cost that should go into those rates. It is our position, as stated previously, that the complainants are not in position to question what rates the City of Athens may charge, or any part of the elements of cost that go into the making of that rate.

Judge Allen: Objection sustained.

Mr. S. D. L. Jackson: May we have an exception? The witness, if he were permitted to answer the question, would state that the Tennessee Valley Authority never sent the City of Athens bills for anything except power consumed, and specifically, no bills for the appraisal or engineering services, or the auditing services that the witness has previously described were furnished by the Tennessee Valley Authority.

By Mr. S. D. L. Jackson:

Q. Will you state, Mr. Smith, whether or not after the TVA contract was signed, if there were any promotional or advertising activities designed to increase electric consumption that took place in the city of Athens.

Mr. Fitts: We object to that question, may it please the Court, as irrelevant and immaterial.

And there is one other point, I think I have made, but I have not made explicit, and that is, that it already appears from the testimony of this witness that the Alabama Power Company, or no complainant, ever served within the city of Athens; that the only relationship to any of these complainants is at one time the Alabama Power Company served the city of Athens at Wholesale, and that the company sold this very transmission line leading to the city of Athens under the contract of January 4, 1934, which was approved by the Supreme Court in the Ashwander case.

[fol. 764a] Mr. S. D. L. Jackson: If it please the Court, counsel is misinterpreting this evidence that we are offering to show some of the subsidies in the retail set-up that have been furthered by TVA.

Mr. Fitts: And for what purpose, to go to the allegations of your bill that the rates being charged are not sufficient?

Mr. S. D. L. Jackson: To go to the allegations of the bill, sir, that the so-called yardstick set-up is a sham, not a true yardstick but a flannel one.

Mr. Fitts: Exactly.

Judge Allen: Objection sustained.

Mr. S. D. L. Jackson: We may take an exception. If the witness were permitted to answer he would testify that employees of the Tennessee Valley Authority and possibly of the Electric Home & Farm Authority came into the City of Athens, display rooms were opened, and that there was a great deal of promotional advertising activity designed to increase the sale of electric facilities, to increase the consumption of electricity. And if I may ask one additional question.

[fol. 765] By Mr. S. D. L. Jackson:

Q. Did the City of Athens ever receive a bill from the Tennessee Valley Authority for any promotional or advertising expense, Mr. Smith?

Mr. Fitts: We object to that question upon the same ground.

Judge Allen: Sustain the objection.

Mr. S. D. L. Jackson: Exception. And if the witness were permitted to answer he would testify that no such bills had ever been received."

(The witness was excused.)

[fol. 766] EDWARD L. MORELAND was called as a witness on behalf of complainants and, having first been duly sworn, was examined and testified as follows:

Direct examination:

I reside in Boston, Mass., and am a consulting engineer, senior member of the engineering firm of Jackson & Moreland. I am also head of the Electrical Engineering Department of the Massachusetts Institute of Technology at Cambridge. My principal engineering office is in Boston and I have a subsidiary office in New York.

I graduated from the Johns Hopkins University with the degree of Bachelor of Arts in 1905 and from the Massachusetts Institute of Technology with the degree of Master of Science in Electrical Engineering in 1908. In the fall of 1908 I entered the employ of Dugald C. and William B. Jackson, Consulting Engineers, with offices in Chicago and Boston. I was an employee of that firm from 1909 until the end of 1915, during the latter part of the time being manager of the Boston Office.

At the beginning of 1916 I was made a general partner in the firm and remained a partner until the firm was dissolved at the time of the war. During the war I served as Captain and Major of Engineers with the A. E. F., during most of which time prior to the Armistice I served on the Technical Board, which was a board charged with the responsibility of procurement and coordination of power supply for all A. E. F. activities. I was technical executive of that board in charge of all its technical operations. After the Armistice I served with the War Damage Board which was organized under Brigadier General C. H. McKinstry to advise the American delegates to the Peace Commission as to [fol. 767] the damages to physical properties in the coun-

tries of the allied nations. I was technical executive of that board, the organization at its maximum reaching a number somewhat in excess of a thousand specialists, who were investigating damages caused by the war to physical property in the allied countries. After the war and our return to this country, I entered into a partnership with Dugald C. Jackson, who had been the senior member of the old firm of D. C. and William B. Jackson, a partnership operating under the firm name of Jackson & Moreland. That partnership continued until the end of 1929 when Mr. Jackson retired. I then formed a new partnership, continuing the business under the old firm name of Jackson & Moreland, and I am senior partner of that firm, and have as my partners Frank M. Carhart and Ralph D. Booth.

The major activities of our firm and of the predecessor firm are related to the electrical industry and quite largely for the public utilities companies, but to some extent they are in connection with the larger industrial companies who have plants of their own, and to some extent in connection with public bodies. We render consulting advice on developments and on operating programs to the public utilities and also to the larger industrial organizations, and we design and supervise the construction of new facilities. At times we are engaged in activities in connection with valuations and rate cases, sometimes for the utilities and sometimes on behalf of regulatory bodies. Illustrations of the type of work we do are: when the Philadelphia Electric Company was considering the desirability of developing the hydro electric plant on the Susquehanna River, which is known as the Conowingo Plant, we made an exhaustive study of the economic advisability of that development, including preliminary designs and estimates, and advised the Philadelphia Electric Company in connection with that proposed undertaking. When the undertaking went forward, we determined the economic number and size of generating units to be installed and made some study of the suitability of the 220,000 volt transmission lines from the Conowingo Plant to Philadelphia, a distance of approximately 70 miles, and advised on methods of assuring electrical stability of that line. When the New England Power Company was developing its plant at Fifteen Mile Falls on the Connecticut River, we determined the electrical characteristics of the generator, of the existing equipment and turbine governing equipment, and of the 220,000 volt trans-

mission line to insure stable operation of that system. We were also consulting engineers on the design of the Somerset Station of the Montaup Electric Company, near Fall River, Mass., with an ultimate capacity of 180,000 kilowatts. We did not make the detailed designs of any one of those three stations that I have referred to.

We are at the moment engaged in the design and supervision of the construction of an enlargement of the generating facilities of the Boston Edison Company of Boston, Mass. At one station we are installing a high pressure steam turbine to be operated at a pressure of 1200 pounds, and at a temperature of 950° Fahrenheit, and are installing two large boilers to supply the steam requirements of that new turbine. At another of their stations we are supervising the rebuilding of the 1200 pound boilers already in that plant to increase their capacity by about 40 per cent.

We were the consulting engineers in responsible charge of the design and supervision of construction of the electrification of the Great Northern Railway through the Cascade Mountains. We were also consulting engineers in responsible charge of the design and supervision of construction of the suburban electrification of the Delaware, Lackawanna & Western Railroad outside of New York. We have also been engaged in a great many activities in connection with valuations and rate cases.

I am a fellow of the American Institute of Electrical Engineers, a member of the American Society of Mechanical Engineers, a member of the American Society of Civil Engineers, a member of the Boston Society of Civil Engineers and I think of several others.

Of the 10,000,000,000 kilowatt hours estimated total energy available from the TVA Unified Plan in a typical year, I have estimated 7,670,000,000 kilowatt hours would actually be generated in a normal water year, which includes 778,000,000 kilowatt hours of dump power, leaving 6,892,000,000 kilowatt hours of firm power and secondary power with definite guarantees as to the amount of time during which it would be available.

Examination by the Court:

Secondary power is guaranteed as being available during certain times. The TVA contracts with respect to that type of power are of two kinds, one in which they guarantee

that the secondary power will be available at least 75 per cent of the time during each year. With that type of power, a manufacturer can schedule his operations, for he will know that he is going to get his power at least 75 per cent of the time during the year. In a normal water year he will get it all the time. This type of power is quite useful to chemical [fol. 770] manufacturers and establishments of that kind. TVA has also contracted for a somewhat lower grade of secondary power, which they guarantee will be available 75 per cent of the time during the contract period; but it might be shut off for a whole year, for example. Dump power is power which TVA sometimes calls fugitive power. It is only available during some seasons of the year and no guarantees can be given as to the time when it will be available or whether it will be available at all. On that type of power, a manufacturer cannot depend for his manufacturing processes, but if he has a steam plant of his own, or if a utility has a steam plant of its own, if the dump power is offered at a price less than the operating costs of their systems already installed, then the manufacturer or the utility company can purchase that power and either shut down or reduce the operation of its own plants and save fuel. Dump power is really only useful to save fuel in existing plants, and that is the reason I have estimated that only 778,000,000 kilowatt hours of that type of power can be sold, although a great deal more would be available in the normal year. The market for it is limited.

Direct examination continued:

The table (offered and received in evidence as Complainants' Exhibit 499) shows, as its title implies, the annual sales by existing utility systems to ultimate consumers in the year 1936 within three different zones. The first zone is that covered by a radius of 100 miles from any TVA generating plant included in the so-called Unified Plan, which includes all dams existing, under construction or recommended for construction by the TVA and with all of the ultimate installations as indicated by the reports of the [fol. 771] TVA to Congress completed in each of the 11 developments.

Examination by the Court:

It is customary, and the TVA is following the customary plan, when making a hydro development, to provide certain

parts of the foundations and the footings for as many units as they think may ultimately be required at the station. There is initially installed only such generating equipment as will be required to meet the power demands in the near future. The reasons for making provisions for later installations are that they can be made so much cheaper at the time the construction work is done and before water is impounded behind the dam. In speaking of the ultimate developments of the projects, we mean the installation of the number of units which have been designated in the hearings for the First and Second Deficiency Appropriation Bills as to the number of units which will ultimately be installed at the various developments. Without knowing by personal investigation, I assume that TVA is making provision for the installation of all units which they now refer to as ultimate installations, which is simple economics to do it.

Direct examination continued:

However that may be, my testimony deals with what is described as the ultimate installation in the TVA reports to Congress.

The table (Complainants' Exhibit 499) shows the actual sales by all utilities and municipal plants within a 100 mile radius, a 150 mile radius, and a 250 mile radius of any of the present or proposed 11 TVA dams. These are the actual total sales, excluding sales by TVA and its contractors. In the first column is given the direct sales by [fol. 772] complainant companies to their own customers whom they serve directly. In the second column, under the heading "Indirect Sales", there is given the total sales made by distributing companies or municipalities of power purchased from other utilities. The third column in the first line of each group shows the total sales directly or indirectly by complainant companies and the fourth column shows the total sales by non-complainant companies within these same zones. There is also set out in each zone the total of all sales and the percentage of the total sales which are made by the complainant companies.

Within the 100 mile zone in 1936, the complainant companies sold 60.9 per cent of all kilowatt hours sold, excluding TVA sales to direct customers or through wholesale contractors. In the 150 mile zone, that percentage was

37.3 per cent of the total and within the 250 mile zone it was 33.7 per cent of the total. Complainants' Exhibit 327, which is a map showing by colored areas the territories served by complainant companies, shows why that percentage varies in that a much greater proportion of the area within the 100 mile zone is covered by the territory of the complainant companies than of the outer zones.

Referring to the map (Complainants' Exhibit 327) which shows the service area of each of the complainants and the geographical relation of their respective service areas and the dams included in the TVA Unified Plan, constructed and to be constructed, and which are to be interconnected to form the TVA grid system or power pool, it would be commercially feasible to transmit power in substantial quantities from that power pool for distribution in the [fol. 773] service area of each of the complainants. If the TVA Unified Plan as set forth in its report to Congress under date of March 31, 1936 and as set forth in the subsequent statements of its Directors before the Appropriations Committees of the Congress is completed, and if large quantities of TVA power are transmitted and sold in the territory of any one of the complainants, it will in my opinion result in rendering partially or totally useless considerable portions of the complainants' properties and will cause losses of markets, business and income.

I have made a study of the areas surrounding the TVA power pool, which will result from the completion of the TVA Unified Plan, to determine how widely such power would have to be offered for sale in order to find a market for the amount which I estimate will be produced. That area is already served by utility companies to a very great extent. There are some minor unserved areas, not minor in square miles so much as minor in potential ability to use electric service. This means that TVA will be in competition with existing utility service, and consequently, unless it takes all of the business of those utilities in the area, it will have to spread out over a wider area in order to find a market for all of its power output than would be necessary if it were taking all the service within the area it serves, for the same reason that where two agencies are serving an area in competition with each other, the area required to absorb the product will be larger than if there were only one agency. My study leads me to the opinion that TVA, in order to find a market for its entire output of salable power,

will in general extend beyond the 150 mile radius. I do not expect that TVA's zone of activity will be confined by any regular line such as the circumference of the circles drawn [fol. 774] on the map. I assume that this boundary of their zone will be irregular, that it will be influenced by available markets at varying distances from TVA plants; but in general I am of the opinion that TVA's active territory will extend somewhat beyond the 150 mile zone shown on the map, Complainants' Exhibit 327.

I have made a study and formed an opinion of the extent of the transmission system which would be necessary to market the 7,670,000,000 kilowatt hours of firm and secondary energy which will be produced by the completion of the TVA Unified Plan in a typical year under conditions of utility operations which obtain in the southeastern part of the United States. It is my opinion that between 12,000 and 15,000 miles of transmission lines will be required for that purpose. I do not know how many miles of transmission lines have actually been constructed, but in the hearings for the Second Deficiency Appropriation Bill of 1937 the mileage expected to be constructed by 1937 is stated as 1079 miles. The reasons for my conclusions as to the total amount of TVA transmission lines which will be necessary are that the southern division of the Commonwealth & Southern had in 1936 approximately 9600 miles of transmission lines for the service of their area and this utility system serves substantially all of the business in the area. TVA will have a much greater output to dispose of than the southern division of Commonwealth & Southern had in 1936. TVA will be in competition with the utilities throughout this area, and consequently, it may be expected to require probably considerably more mileage of transmission lines in relation to the power sold and certainly as much. The ratio of power available for sale on the TVA system after its ultimate development and on the Commonwealth & Southern system would indicate that the TVA, even if [fol. 775] it served the whole area, would require in the neighborhood of 15,000 to 16,000 miles of transmission lines, so that I feel that my estimate is on the low side rather than the high side.

The table, (offered and received in evidence as Complainants' Exhibit 500), shows on its face that it sets forth the miles of transmission lines of all of the complainant com-

panies, which total is 11,314 miles. That includes the mileage of these complainants lying outside of a 250 mile radius from any TVA dam in the Unified Plan.

I have made a study of the adequacy of all of the major utility systems operating within the zone defined by a 250 mile radius of any dam in the TVA unified grid system, which would result from the completion of the TVA Unified Plan as outlined to Congress. Previous witnesses have testified to the adequacy of all of the complainant companies, except The Kentucky-Tennessee Power Company, The East Tennessee Light & Power Company, and the Tennessee-Easter Electric Company, and have also testified as to the adequacy of all non-complainant companies within this zone which are associated through holding company relationships with any of the complainants, with the exception of the Central Illinois Light Company, the Southern Indiana Gas & Electric Company, the South Carolina Electric & Gas Company, and the Lexington Water Power Company. We have taken the results testified to by previous witnesses for all of the companies considered. As to the other companies within this 250 mile zone which have not been covered by previous witnesses, my own organization under my direction has studied them, with the exception of the South Carolina Electric & Gas Company and the Lexington Water Power Company which have been studied by representatives of those companies along methods outlined by my engineering firm under my direction.

I have made a summary to show the results of my study of the adequacy of all major utilities operating within the 250 mile area, including in that summary the data as to the associated non-complainant companies presented by other witnesses.

The table (offered and received in evidence as Complainants' Exhibit 501) summarizes the results of the study of adequacy which I have just described. Each of the columns under headings, with dates running consecutively from 1929 to 1939, shows the conditions obtaining or expected in the respective years. We divided the zone covered by the area within the 250 mile radius into 12 sections which we have designated as integrated groups. These groups vary largely in size, but each group was selected in such a way that the companies serving the area covered by that group are closely interconnected by tie lines and function normally as

one integrated group within the area. At the top of the page there is summarized the results of the first five groups. Lower down I have summarized the results for groups 6 to 12, inclusive, and at the bottom of the table I have summarized the totals for all groups. The reason for splitting the table into two sub-totals is that five of these groups are not only closely interconnected within each group, but the groups are also closely interconnected. The data on this exhibit up to and including the year 1936 is actual and historical.

This set of seven tables (offered and received in evidence as Complainants' Exhibit 502) is the underlying exhibit to [fol. 777] the summary exhibit marked Complainants' Exhibit 501. Sheet 1 of Complainants' Exhibit 502, shows the companies integrated within the group which we have designated on Exhibit 501 as "Integrated Group 1."

The map (offered and received in evidence as Complainants' Exhibit 503) shows the 12 integrated groups delineated by green boundary lines with the large figures in green indicating the number of the group as shown on Complainants' Exhibit 502. The fact that these integrated groups vary greatly in size is apparent from the map. For instance, Group 1 covers a very large section of the southeastern territory, whereas Groups 7, 9, 10 and 11 cover very small areas. The reason for making Group 1 cover a large area is that the companies operating within that area are so heavily interconnected and actually operate substantially as a single unit. On the other hand, Group 11, for example, north of Nashville is a small area that is served by a system that is not interconnected with any other systems through any transmission lines of sufficient capacity to make the interchange of power possible, and Group 12, which lies wholly within the City of St. Louis, consists of one small isolated electric company which operates entirely independently.

In Group 1 the following companies operate: Alabama Power Company, Birmingham Electric Company, Georgia Power Company, Gulf Power Company, Mississippi Power Company, South Carolina Power Company, Southern Tennessee Power Company and The Tennessee Electric Power Company. The map, Complainants' Exhibit 503, clearly shows the territory of the integrated groups within 250 miles of the TVA Power pool. (Thereupon the Court called [fol. 778] attention of counsel again to its rulings that it

would not consider any evidence concerning the operations of the Georgia Power Company).

I will not mention the Georgia Power Company other than in the same category in which I refer to other non-complainant companies, as I have been instructed that the Georgia Power Company is a non-complainant and my figures are set up on that basis. Our study of adequacy includes all companies within the 250-mile zone, and consequently includes a large number of noncomplainant companies.

On Complainants' Exhibit 502, under the side caption "General Capacity Owned and Leased, Name Plate Rating, in the year 1929", there appears the entry 1142. The top of the table shows that these figures are all in thousands of kilowatts so this, of course, is 1,142,000 kilowatts, which is the installed generating capacity within Group 1 having a name plate rating of 1,142,000 kilowatts. That is the total sum of the name plate ratings of all generating units, regardless of whether or not there may be other limitations on the operation of the generating stations in which the capacity is installed which would reduce the available capacity. For the companies for which testimony has been given by other witnesses, we have taken their figures as to the generating capacity owned and leased. For the companies for which we have made the determinations, we have taken our figures from copies, furnished to us by the companies, of reports made by those companies to the Federal Power Commission, in connection with its surveys, with the exception of one company where we got the information from the reports of the company to the Department of Utilities in the state where it operates.

The next item on Complainants' Exhibit 502 under the side caption "Load Carrying Ability in Addition to Stand-[fol. 779] by", which for identification shows 746,000 kw. in the column for the year 1929, is the generating ability of these generating systems after making allowance for such restrictions on operations as insufficient boiler capacities to operate all of the generators in the station, and in the case of hydro plants making allowance for low water conditions. It includes only the firm capacity of the company in the extreme low water seasons. The data for this item was secured in exactly the same way as for the previous item, from testimony of witnesses as to certain of

the companies and from the reports to the Federal Power Commission for the others, with the single exception that I have noted. This item of load carrying ability also includes, in addition to the company's own generating capacities, the firm power contracts which the companies may have for power coming from outside of the group under consideration. In stating this figure, a deduction of capacity has also been made to provide for stand-by which I will discuss a little later.

The next item on the table (Complainants' Exhibit 502) under the side heading of "Firm Peak Load" for the year 1929 shows 718,000 kilowatts which, in the case of the years from 1929 to 1936, is the actual peak load carried by the utilities within the integrated group. Our studies include all of the major utilities and all subsidiary utilities purchasing their power from the major utilities.

Examination by the Court:

The figures for the years 1937, 1938 and 1939 were forecasts.

Direct examination continued:

Within these zones there are certain small isolated systems, mostly municipal plants which are not included be- [fol. 780] cause information could not be readily secured for them. From a study we have made, we have determined that we have actually included in our tabulations approximately 95 per cent of the total electric generation within the 250-mile zone, so approximately 5 per cent is supplied by small isolated units not included in our study.

The next item on the table (Complainants' Exhibit 502), "Surplus Capacity Available Over and Above Actual and Predicted Loads, in Addition to Stand-by", for 1929 is 28,000 kilowatts, which figure is shown increasing through the years 1930, 1931 and 1932, and which figures were abnormal because of the depression conditions which brought not only a decrease in the expected growth that the companies had provided for but an annual decrease below the actual output for the year 1929, as is shown by the way in which the firm peak load had dropped off. The final item in each group, that of stand-by, is in some respects one of

the most important items in the group. A stand-by is necessary because a utility company has the obligation to furnish continuous service to its customers so far as it is humanly possible. The owner of an industrial plant supplying his own power is likely to depend upon a single generating unit, and if that unit fails, he must shut down his factory until the unit is repaired. Stand-by is reserve generating equipment which is used in case of emergencies and is either steam or hydro. In the case of steam plants, it is necessary to make the full allowance for the largest unit in the plant or in the system. If you have, for example, a 50,000 kilowatt steam turbo-generator as one of the units, you then have to assume that that unit is out and you have to be in a position to carry all of the other [fol. 781] load without that largest unit.

"Judge Martin: In all these growths, Mr. Moreland, or increase from 1929 through 1936, isn't it somewhere, broadly or approximately around 22 per cent in load carrying capacity in the areas?

The Witness: That is correct."

In the case of a system supplied entirely by hydro plants, it is not necessary to make the deduction for outages of the largest unit, for the reason that substantially always, for economic reasons, and in order to take advantage of the power that is available during part of the year, the installation of equipment in hydro plants is materially in excess of the firm power available from the water supply. In low water seasons,—and it is only the low water capacity of hydro plants that we have included in the load carrying ability—there will be idle generators available in stations anyway, so if one unit fails the idle unit is merely substituted. In the case of a system depending entirely upon hydro, it is not necessary to make a deduction for the outage of the hydro unit, because the available capacity will be there. In the case of a system which has a combination of both steam and hydro, the available capacity in the hydro plants can be made to offset the loss of the steam unit, provided the company in its reservoirs holds reserved water. We have assumed, in determining this surplus over and above the actual predicted load requirements under the pessimistic assumption that we will lose the stand-by, the loss of generating capacity equivalent to the amount

of stand-by provided, at the time of the system peak load, which is for a relatively few days during the year, and that coincident with that we will have at all of the hydro plants connected with the system extreme low water conditions of a character which occur only once in every ten years or more. The figures that we have given are pessimistic and [fol. 781a] the capacities that we show as surplus capacity available are capacities which a prudent management would be justified in selling to the market if it had the customers available.

This whole question of reserve capacity is very important for many reasons. The utility is faced with two [fol. 782] obligations, the obligation to give uninterrupted service to its customers so far as humanly possible, and the obligation to cut its cost as low as possible. Transmission lines do fail at times and that difficulty is obviated as much as possible by having loop connections to make it possible to supply power from some other source, although that is not always possible. The second obligation is to cut the cost as low as possible. The utility cannot afford to install a tremendous surplus of capacity over and above that which will be required to provide the capacity anticipated and to provide adequate stand-by, and if the utility company does, it will run up its costs. Some of the utilities were severely criticized for the excess capacities that they had in the years 1930, 1931 and 1932. A utility company has to provide its capacity somewhat in advance, and particularly it has to begin its construction well in advance. It takes from a year to two years to build a steam plant and from two to three years to build a large hydro plant. Consequently a utility must determine what its load conditions are likely to be two or three years in advance and meet those expected conditions. When there is a condition such as existed in the depression in 1930, the utilities had already made provision and were in process of expanding their plants to meet loads they expected to develop, and when the loads actually fell off, there was a surplus capacity. Complainants' Exhibit 501 makes this situation very clear. In some cases utility commissions refused to allow utilities to earn on the large amount of surplus capacity for which provision had been made with the expectation that the load growth prior to 1930 would continue.

[fol. 783] The operating efficiency of stand-by units is not important. The important thing about stand-by units is that

they shall be available for service if needed. The probability of needing stand-by units is small, because they will not be needed unless some other unit fails at the time of the system peak and at the time of extreme low water conditions if there is any hydro-generating system in the particular group. If a stand-by unit operates only a relatively short time over a long period of years, perhaps not operating at all for years at a time and then operating for only a few weeks, it does not make very much difference whether the unit requires one pound of coal per kilowatt hour or takes three pounds of coal per kilowatt hour, because it does not run long enough to use very much coal. If the old stand-by unit were replaced by a new unit, there would be fixed charges to carry on that new unit, year in and year out. As a matter of fact, if a utility company put in a new unit to replace some of the older units which are on the stand-by line, the company would actually operate those new units and push up some of those older units into the stand-by reserve. In other words, the utility always operates its most efficient units and puts in reserve the least efficient. A turbine 20 years old is just as good for stand-by capacity as a new one, providing it is in condition to operate when needed. That is a question that I do not think is fully understood and that is why I have emphasized it so long.

We have made studies of each of the 12 groups, as stated in Complainants' Exhibit 502, and the results are summarized on Complainants' Exhibit 501. This summary shows that groups 1 to 5, inclusive, which, as I have already explained, are so interconnected by transmission lines that they actually operate in synchronism, have sufficient transmission capacity between the groups to transfer large blocks [fol. 784] of power from one group to another. The results show that at no time during the period from 1929 to 1936 has the surplus capacity been less than 346,000 kilowatts, and that was in the starting year of 1929. During the periods from 1931 to 1934, inclusive, the surplus capacity was a great deal larger. For the years 1937, 1938 and 1939, the capacities shown are the present capacities plus the capacity of installations already scheduled by the utilities. The loads are the estimated peak load requirements during those years, and the surplus is the difference between the capacities and the peak load requirements, plus the stand-by reserve. The total shows that for the first five groups in this current year the surplus capacity will fall to 241,000

kilowatts, but the capacity already scheduled to be brought into operation in the year 1938 will increase the surplus capacity of these five groups together to 416,000 kilowatts in spite of an estimated load growth in that period of nearly 300,000 kilowatts at the peak. In 1939 the surplus capacity will be 285,000 kilowatts.

In integrated Group No. 4, which is on this first list and is shown in detail on Sheet 3 of Complainants' Exhibit 502, in the year 1939 there is an indicated overload condition of 4,000 kilowatts which has no significance at all. It is less than $\frac{1}{2}$ of 1 per cent of the firm peak load on the system and would occur only if 89,000 kilowatts of capacity were out of service at the time of the system peak and if the hydro plants had their minimum water conditions. This group is heavily interconnected, not only with other groups within the 250 mile zone, but also with utilities outside of that zone. The figures given for these first five groups are the sum of the [fol. 785] figures for the five groups individually and do not take into account the fact that there may be some diversity of time as to when the peak loads occur in one group as compared with other groups with which it is connected, so there is actually a greater surplus capacity available than we have indicated.

Examination by the Court:

As to the distribution in percentage between steam and hydro of the installations already planned by utilities for 1938 and 1939, I think I am correct in saying that there are only two major hydro developments being undertaken by utilities within this 250 mile zone. One of those is in the Appalachian Electric Power Company system and has approximately 100,000 kilowatts capacity. The other is a development in the Arkansas system. Both are scheduled to be brought into operation in 1939.

Direct examination continued:

The first five groups are the major units and as shown by the summary cover more than 90 per cent of the total capacity within the area. In the other seven groups there are not sufficient interconnections with any adjoining utilities to provide for the transfer of a substantial block of power, though they may not be completely isolated. In a very few cases, as is seen from Complainants' Exhibit 502,

there is a theoretical indicated deficiency or overload requirement in past years under the extreme combination of circumstances that we have used in determining adequacy, but in none of these cases is there any overload indicated for the years 1938 or 1939.

There are three major advantages of interconnected operations. One is that it permits the companies so interconnected, assuming that they have operating agreements, [fol. 786] to utilize the most efficient generating units within the group, regardless of where they may be located, and thus bringing about further economies. The second important advantage is that it permits the operation of smaller total floating reserves. In addition to stand-by reserves which are not operated but are available to operate in case of failure of some other unit, power companies also have to have a certain amount of floating reserve actually connected to their system so that in case of loss of a unit the load can be carried by the remaining units. This is ordinarily taken care of by having enough units on the line so that the units in operation are not loaded up to their total capacity, and then if a unit fails, the other units can carry the load, perhaps running some above their rated capacities until a new unit can be brought into operation. The utility companies always have enough units connected to their system so that if the largest unit is lost, the remaining units can carry the load. If there is an interconnected group, the floating capacity can be reduced below the total floating capacity that would be required if each generating plant or each company operated in an isolated condition. There is a similar third advantage in the case of stand-by reserves, as the same stand-by is available for any part of the interconnected system. I have referred several times in connection with this stand-by to making provision for the loss of the largest steam unit. In Groups 4 and 5, we allowed for the loss of additional capacity over and above the largest steam unit, equal to 3 per cent of the peak requirements of the group.

Our reason for carrying our study only through 1939 is because that was the time within which new facilities in our opinion could be provided. Our study does not show any inadequacy of the facilities of the utility systems within [fol. 787] this 250 mile zone for the years immediately preceding the passage of the TVA Act in 1933. As I have

already pointed out, the surplus capacity available during the years 1931, 1932, 1933 and 1934 was abnormally high due to recessions in business. There is no question that the utilities can build to meet any requirements which they may face in future years, unless of course they are unable to obtain necessary regulatory approval of proposed extensions, or unless threatened competition from TVA or something else so weakens their financial status that they cannot finance construction. From the technical and engineering standpoint there is no question whatever that the utilities can build to meet any requirements that they may face.

"Judge Allen: The exhibit, 503, is received under the limitations heretofore stated by the Court, and the Court wants to make it perfectly plain that its ruling with reference to the Georgia Power Company is not merely a ruling that the Georgia Power Company simply has the status of a non-complainant in this case. The ruling of the Court is more definite than that, as made unanimously. The ruling of the Court was not merely that the Georgia Power Company would not be considered a complainant, but it was that no evidence would be received or considered with reference to competition or alleged competition by the Tennessee Valley Authority with the Georgia Power Company.

Mr. R. T. Jackson: We do not offer the map for that purpose, Your Honor."

I have made an estimate of the total cost of TVA power upon the completion of the TVA Unified Plan.

"Q. Mr. Moreland, will you tell us briefly what you have found with reference to the cost of TVA power on the completion of the TVA Unified Plan, and describe briefly the methods you have used in making your estimates?

Mr. Fly: I object to it on the ground that it is irrelevant and incompetent.

Mr. R. T. Jackson: And I want to say that I am offering this line of testimony, which of course, is not fully exhibited [fol. 788] ited by this question, but which perhaps the Court will generally understand the nature of, for three primary purposes, contending that it is relevant and admissible for each of them, and of course if I am right about any one of them, why it would control the admissibility of this testimony.

The first purpose for which I am offering this testimony is to show that the defendants have announced rate schedules and offered for sale the TVA power at a price very substantially below the cost of generating and transmitting that power to the point or points of sale, in violation of the TVA Act. In that connection I want to make clear that the testimony which it is proposed to offer is not affected by any discretion that may be claimed to exist with reference to fixing prices on the assumption of a normal loading of the TVA system. There is, as Your Honors of course will appreciate, a recognition in the statute that it is possible that the TVA might not be able to get the markets away from the utilities, and to sell this power as rapidly as they increase their generation towards their ultimate goal.

And the statute, therefore, says that these defendants may in determining a price which will yield a profit to the Government take into consideration the fact that the system is not fully loaded, and that to fix the price for a partial loading might presumptively result in too high a price or prevent them from engaging in effective competition with these Complainants.

Now, our testimony is going to be based upon the assumption that TVA sells all of the power, firm and secondary, within the practical limits of the utility operation, and by that I mean assuming that they get as much load as they could practically carry, upon the completion of their unified plan outlined to Congress, and the installation of the ultimate power capacity which they have suggested might be provided.

And we intend to show that upon that hypothesis there would be a very large deficit in the receipts from the sale of TVA power in comparison with the cost of producing that power. So we are not concerned with this discretion to take into consideration the fact that in the early days the plant may not be fully loaded. We are giving it the benefit of every doubt, in the testimony which we propose to offer.

I also suggest the further point that if it be said that the defendants might retard the installation of the ultimate number of generating units which they have told Congress would be proper to be installed in these plants, it again does not affect the admissibility of our evidence on the question under the statute, for that could only increase the per unit cost of the power actually produced as Your Honors will readily perceive and make the deficit in receipts at sales

under TVA rates even greater than it would be if they in- [fol. 789] stalled the full amount." (Counsel for complainants then stated that this line of testimony was also offered to show further (1) that if it be conceded that the Federal Government has a right to regulate the intrastate businesses of the complainants, such regulation by rates fixed far below the cost of production is confiscatory and in violation of the Fifth Amendment to the Constitution; and (2) that because the TVA is offering power for sale in competition with the complainants at rates far below the cost of production, the extent and imminence of the damages and destruction with which complainants are threatened is immeasurably increased.)

"Judge Allen: The matter is before the Court upon objection to the question asked. The Court sustains the objection. You may have your exception.

Mr. R. T. Jackson: Exception noted, please."

The table (offered in evidence as Complainants' Exhibit 504) was prepared under my direction. It correctly states the factual data and information which it purports to show and in so far as it contains matters of opinion or estimate, it correctly states my opinions and estimates.

The table (offered in evidence as Complainants' Exhibit 505) was prepared under my direction and correctly portrays what it purports to show.

The table (offered in evidence as Complainants' Exhibit 506) entitled "Summary of Annual Deficit from TVA Operations, Unified Plan, and Ultimate Development Excluding Initial Stage at Wilson," was prepared under my direction and correctly states what it purports to show.

"Q. Does that exhibit include a great deal of data which was not available when the Tennessee Valley Authority announced its rate schedules in September, 1933?

Mr. Fly: I object as irrelevant and incompetent.

Judge Allen: The objection is sustained.

Mr. R. T. Jackson: Exception noted, and we offer to show that this witness, if permitted to answer, would testify that these exhibits marked 504, 505 and 506, contain a great deal of data which was not available when the Tennessee Valley Authority announced its rate schedules to the public in September, 1933,—was it, Mr. Fly?

[fol. 790] Mr. Fly: Yes, that is right.

Mr. R. T. Jackson: I think that is the date given to the press at that time. At this time I assume first that the Court does not want me to ask the witness to explain these exhibits in view of its general ruling that material of that character would be excluded.

Judge Allen: Are they offered in evidence?

Mr. Jackson: Well, I am trying to protect the record and not burden the Court any more than I can help, and that is the reason I have not offered them. And I wanted to know, if the Court would indulge a further question, whether any objection will be made that I do not take the time of Court or counsel to further qualify the exhibits by showing the methods and studies that were made which underlie them.

Judge Allen: Is there any objection on that ground?

Mr. Fly: Yes, Your Honor. I object to all of the questions regarding the exhibits and the data on them.

Judge Allen: Well, do you contest the fact that these exhibits are based upon studies made by Mr. Moreland in his office, the kind of studies I assume which were testified to with reference to the others?

Mr. Fly: No, I don't believe so.

Mr. R. T. Jackson: I could ask a great many questions to qualify the exhibits, but I was trying to avoid taking the time of Court and counsel further on that.

Judge Allen: There is no objection on that ground, I assume.

Mr. Fly: I assume that he will then state the exhibits represent his opinion.

Mr. Jackson: He will state that they represent historical data in so far as they do, and his opinion and estimate in so far as they are not historical data.

Mr. Fly: Well I will concede he would so testify, and I would like to object to any and all other questions regarding these exhibits, and object to each of the exhibits themselves as incompetent and irrelevant.

Mr. R. T. Jackson: I have just been trying to avoid asking those other questions, Mr. Fly. We, upon this statement of counsel, with the permission of the Court, offer separately Exhibits 504, 505 and 506, Complainants' Exhibits.

Mr. Fly: We object to each one.

Judge Allen: Exhibits 504, 505 and 506 are rejected and you may have your exception, separate exceptions.

[fol. 791] Mr. R. T. Jackson: We take exception to the ruling of the Court in excluding each of these exhibits, separate exceptions.

And we offer to show or to prove by the witness E. L. Moreland now on the stand, that were he permitted to answer the question to which the Court has sustained an objection and were permitted to continue his testimony upon this line,—and I assume there is no objection either by Court or counsel that I do not develop that line by merely follow-up questions,—is that right?

Judge Allen: The Court appreciates that.

Mr. R. T. Jackson: The witness would say, upon the subject of the cost to TVA of power generated and transmitted by it to wholesale contractors, and as to a comparison of that cost to the cost which would be sustained by a private utility in the generation and transmission of an identical amount and quality of power and energy, reserving all our exceptions, as follows:

I have made an extensive analysis of the total cost to Tennessee Valley Authority of the generation and delivery of power after completion of the TVA Unified Plan which I have previously defined in my testimony in accordance with my understanding.

The first part of my analysis consisted of determining the investment of the Tennessee Valley Authority in property properly chargeable to power generation. For the purpose of this analysis I accepted as basis the figures presented by the TVA during the hearings on the Second Deficiency Appropriation Bill for 1937. In this analysis I have determined the investment in the total development over and above that portion of the Wilson Dam Development which was in existence at the time it was turned over to TVA.

I am familiar with the testimony of the previous witnesses Putnam, Kurtz and Kelly on respective subjects about which they testified relative to the amount of investment requisite for the degree of navigation improvement and a much greater degree of flood control than could be incidentally accomplished, or would be accomplished by the TVA Unified Plan.

For the purpose of this analysis only, I have accepted the estimates of Putnam and Kurtz as representing the maximum possible value of the TVA facilities made available for navigation and any flood control purposes.

many persons who wanted service before line extensions were made to give such service. Each year line extensions have been made and many new customers served. All we are claiming is that we have reasonably extended service wherever this—in the light of the facts existing at the time—was reasonably justifiable. Whether or not any claimed failure on our part in this respect is relevant, it is clearly not relevant merely to show that an unsatisfied demand existed without showing that at the time the demand was such as to justify or require extension of service.

5. There is no materiality in proof that an unserved demand existed in 1935 or 1936 which fell within the minimum requirements of the TVA Neighborhood Plan or within the minimum requirements of any State regulation, where, as is shown here, the demand was for TVA power; and not for service from any privately-owned utility complainant in this case. No failure of obligation appears from the failure to respond to a demand which was a demand for TVA and not for Complainants' service. Nor is there any legal justification for the Federal Government going into the power business merely because members of rural cooperative corporations desire TVA power rates rather than other available service.

Mr. Fly: May we have the grounds of objection, rather than all the argument?

Mr. Bemis: I think the grounds for objection ought to be stated fully. I understand that is the rule.

Judge Allen: Well, they are being stated fully.

Mr. Bemis: Proof offered by complainants that there is no substantial demand servable under TVA minimum requirements at the present time, is material, and was offered to show that TVA power to be sold in this area must be sold to the existing customers of the complainant companies.

Judge Allen: The Court in no way indicated in this ruling that evidence could not be offered if it was material, relevant and competent, to contradict the testimony of Cowley and Hutchinson contained in these depositions.

[fol. 640] Mr. Bemis: In other words, the Court's ruling is that we may not rebut the testimony of those two witnesses?

Judge Allen: No, that is not the ruling of the Court. The ruling of the Court is contained in the ruling read, and there was nothing stated in that ruling to the effect that you could

not contradict the statements of Cowley and Hutchison, if you did so by competent, relevant and material evidence.

Mr. Bemis: Must that be done as part of the Complainants' case in chief?

Judge Allen: We will leave it to complainants?

Mr. R. T. Jackson: Of course it seems to us that if the defendants are to be permitted to put in part of their case as part of the plaintiffs' case, then that we ought to be advised as to whether that is going to shift the usual rules of order as to when we would have to offer rebuttal. It is our understanding they have no right to offer evidence until their case is on.

Judge Allen: I think you will concede, Mr. Jackson, that the Court has a very wide discretion in the offer of proof and the order of proof. That is the general rule. This is not a jury case. This Court is capable of following the proof, and sifting it out, and to decide what proof is offered by what party, and what constitutes the complainants' case, and what constitutes the defendants' case.

Mr. R. T. Jackson: There is no apprehension of any difficulty of the Court on our part that leads me to make that remark. It is that ordinarily one hears his adversary's case, and then has an opportunity to prepare and present rebuttal if he deems it necessary. But if his adversary's evidence is interposed with his case and he is required to also put in his rebuttal before the close of his case, he has little opportunity for it.

Mr. Fly: I know you are surprised, Mr. Jackson.

Mr. R. T. Jackson: I am very much surprised to find——

Mr. Fly: You cannot be surprised at anything in your own deposition.

Mr. R. T. Jackson: I am very much surprised to find you offering evidence as a part of our case.

Judge Allen: The Court considers this matter rather immaterial. The Court ruled upon the depositions as they were offered. Incidentally it accepted in evidence the depositions of Cowley and Hutchinson, which the complainants did not offer, but the defendants offered.

Judge Allen: You may have your exception and we will proceed with the case.

Mr. R. T. Jackson: If we are to be required to rebut it during our own case in chief——

Judge Allen: The Court does not require you to do any [fol. 641] thing, Mr. Jackson. The Court merely indicated

that the ruling of the Court did not preclude you from doing that. The Court leaves to complainants the conduct of their own case.

Mr. R. T. Jackson: I only want to make the record clear, and I certainly do not want to annoy the Court. My only point is if we must rebut it at all, that testimony, during our case in chief, then we want a specific exception to that ruling.

Judge Allen: The Court has made no such ruling.

Mr. R. T. Jackson: That is the only point I was not clear on, your Honor.

Mr. Bemis: If the Court please, I understand that these depositions may be transcribed in the record as though read?

Judge Allen: Yes."

(The depositions of the witnesses Cowley and Hutchinson, offered by the defendants, are set forth at side folios 1760a to 1760y, inclusive, of this record.

The deposition of R. Carter Pittman is as follows):

B. CARTER PITTMAN was called as a witness on behalf of the complainants and, having been first duly sworn, was examined and testified as follows:

[fol. 642] Direct examination.

(Offered by complainants:)

I reside in Dalton, Georgia, and am attorney for the North Georgia Electric Membership Corporation. I do not hold any other office. As attorney for the North Georgia Electric Membership Corporation, I have the custody of practically all of the records and papers of the corporation. To my knowledge none of the corporate records other than those in my possession are in the possession of the executive officers of the corporation.

The mimeographed contract (offered and received in evidence as Complainants' Exhibit 380) is a copy of an agreement dated April 6, 1936, between TVA and the promoters of the North Georgia Electric Membership Corporation. I have not seen the original agreement in some time. At one time I think the original was turned over to a Chattanooga reporter to keep in connection with the litigation

pending between the Georgia Power Company and the North Georgia Electric Membership Corporation. If I have the agreement, I do not know it, and I have looked for it. The agreement was subsequently assigned to the corporation.

The document (offered and received in evidence as Complainants' Exhibit 381) is a copy of the petition for the charter of the North Georgia Electric Membership Corporation.

The document (offered and received in evidence as Complainants' Exhibit 382) is a copy of the order of Whitfield County Superior Court granting the charter to the North Georgia Electric Membership Corporation. The original of that document is on file in the Superior Court of Whitfield County and I do not have any duly executed copy.

[fol. 643] The document (offered and received in evidence as Complainants' Exhibit 383) is a carbon copy of the assignment of the so-called promoters' agreement with TVA to the North Georgia Electric Membership Corporation.

The Corporation subsequently entered into a contract for the construction of a line with TVA, but I don't recall the date of the first of such contracts. As to whether I can produce a copy of the first construction contract between the Corporation and TVA, I have been unable to find a copy of any construction contract between TVA and the North Georgia Electric Membership Corporation earlier than August 24, 1936. I gave a deposition in a case between the North Georgia Electric Membership Corporation and the Georgia Power Company, but I don't know the date that it was given. The copy of the construction contract of June 15, 1936 between TVA and the North Georgia Electric Membership Corporation, set forth in that deposition, is a true and correct copy of that contract.

Subsequent to June 15, 1936, there was a second contract for construction made between the Corporation and TVA. I have a copy of it. I do not have the original. I do not recall any other contracts made between the Corporation and TVA relating to the construction of lines. The map (offered and received in evidence as Complainants' Exhibit 384), shows the lines of the North Georgia Electric Membership Corporation, and was attached to the construction contract of June 15, 1936. The map referred to in the August construction contract is attached to that contract.

I have in my possession a carbon copy of the contract for power, dated June 15, 1936, between TVA and the North

Georgia Electric Membership Corporation. (This contract is set forth in Complainants' Exhibit 118). Subsequent to June 15, 1936, the Corporation did not, that I recall, enter [fol. 644] into any other contracts with TVA for power.

The Corporation has some other contracts with TVA in addition to those I have produced here. I have some of them here. There is a construction contract which was entered into at a later date, but I have had no notice to produce it. I have a copy of it in my file here, but I decline to produce it without notice, and the reason I state that is because I have only one copy in the office at the present time and it is needed to close up the matter of the final payment to TVA. I have the original in my hand. (The Special Master directed the witness to produce this contract). I do not know of any other contracts between the Corporation and TVA. If there were any other contracts, I very likely would know about them.

I have contracts in my possession between the Corporation and REA. I do not have a copy of an application for a construction loan contract. There is no copy in the possession of the Corporation and there is no such copy in the minute book of the Corporation. I have mimeographed copies of contracts which were made on August 24, 1936, and June 15, 1936, with the REA pursuant to the application. I do not have the original signed copy of the June construction loan contract between REA and the Corporation. This copy which I have says "On the — day of June" — it was June 15, 1936. This is a true copy of that contract. I have also produced a mimeographed copy of a construction loan contract between the Corporation and REA dated August —, 1936. I do not have the original of that contract in my possession nor do I have a signed copy. The Corporation does not that I know of have the original of that contract, and if it did, I would know of it. The map (Complainants' Exhibit 384) was attached to the August 24 construction loan contract.

The document (offered in evidence as Complainants' Exhibit 385) is a mimeographed copy of a construction loan [fol. 645] contract between the Corporation and REA dated September 2, 1936. In answer to whether the Corporation has the executed original of that contract in its possession, I cannot find the executed original. We did have the executed original, but the REA called on us for additional

copies and we apparently sent our original. As far as I know, this is a complete and accurate copy of the original executed contract. (Complainants' Exhibit 385 was excluded by the Court and an exception was allowed the complainants).

The document (offered in evidence as Complainants' Exhibit 386) is a copy of a mortgage deed of trust between the North Georgia Electric Membership Corporation and the First National Bank of Dalton, but I do not have the original. The cover of this document bears the legend "Identified as form of mortgage and deed of trust presented to and approved by stockholders of the North Georgia Electric Membership Corporation at a meeting held on August 24, 1936," and this was the document presented at that meeting. (Complainants' Exhibit 386 was excluded by the Court and an exception allowed the complainants).

The document (offered and received in evidence as Complainants' Exhibit 387) is a copy of the by-laws of the North Georgia Electric Membership Corporation.

The document (offered and received in evidence as Complainants' Exhibit 388) is a circular entitled "Here are the Answers."

(At this point the witness Pittman testified before the Special Master that the circular, Exhibit 388, was prepared by the witness himself and not by the Corporation; that it was sent to every newspaper in the seven counties served by the Membership Corporation; that the copy so sent bore the names of R. H. Bandy, President, North Georgia Electric Membership Corporation, and J. C. Johnson, Secretary-Treasurer, North Georgia Electric Membership Corporation; that the circular was published in the Dalton News, Dalton Citizen, Murray County Herald, Calhoun Times and Walker County Messenger, but that many typographical errors occurred in the publication by the Murray County Herald.

[fol. 646] The witness also testified that on the day prior to the taking of his deposition he went to Chattanooga in response to a call from some employe of TVA; that he there met Mr. Fly, Chief Counsel for TVA, and other TVA representatives; that he discussed with Mr. Fly the subject of his own testimony and the subject of the testimony to be given by Mr. Bandy, President of the North Georgia Electric Membership Corporation; and that at the time of such

conversation with Mr. Fly he knew that Mr. Bandy had been called to testify on behalf of the complainants in this case, and was told by Mr. Fly that he himself would probably be a witness, although at the time he had not been served with a subpoena. This latter testimony was received by the Special Master for the purpose, as stated by counsel for complainants, of showing the close relationship between the North Georgia Electric Membership Corporation and TVA and for the further purpose of showing hostility on the part of the witness. Thereupon the Special Master ruled that the witness was hostile and that complainants had established their right to cross-examine the witness and the further examination of the witness as hereinafter narrated was conducted under such permission and ruling.

The testimony and record of proceedings as summarized in the two preceding paragraphs was excluded by the Court over the objection and exception of complainants upon the grounds that "the testimony deals solely with operations by or competition with The Georgia Power Company" * * * and "for the reason that" the portions of the deposition excluded "offer immaterial testimony." The balance of the deposition of R. Carter Pittman which was received in evidence by the Court was as follows:)

Complainants' Exhibit 380, the copy of the agreement between TVA and the promoters of the North Georgia Electric Membership Corporation, was not executed at the meeting held in the TVA office on April 6, 1936. So far as my present memory goes, it was not called to my attention at that meeting. I do not know by whom it was prepared.

"Q. I have had occasion to call your attention to the testimony which you gave on September 11, 1936 in a deposition taken on behalf of the Georgia Power Company and at page 4 of the deposition there appears this question:

'Q. Do you know whether the contract was prepared before that meeting, or during the progress of the meeting, or what do you know about the preparation of the contract?'

and your answer was:

'A. Well, I do not know anything about when it was prepared, nor where it was prepared. I just know that it was prepared there, and apparently it must have been prepared before the meeting.' "

[fol. 647] If I stated that in September, 1936, my memory was probably better then than now. I do not wish to correct my testimony or my answer in September any further than to say I don't remember now, and if I stated it was true in September, it was true. I do not have any doubt that what I said in September was true. I have not tried to fix those details in my memory. I had nothing to do whatever with the preparation of this agreement except to approve it before execution.

"Mr. Fly: I will state for the record, Mr. Special Master, that the first draft of a contract of that general nature would be made at our own offices and thereafter in the course of negotiations changes that were thought necessary after that were likely to be made anywhere."

Complainants' Exhibit 381, the copy of the petition for the charter of the North Georgia Electric Membership Corporation, was not prepared by me nor by anyone under me. Mr. K. Wilde Blackburn, attorney for the REA, presented to me a draft of a petition for a charter at the meeting in Chattanooga and at that time Mr. Martin, an attorney for the TVA, asked certain questions about it, and it was discussed, and then I asked Mr. Blackburn to send me a draft of what he thought would be a proper application for the charter, which he did, and I penciled it up and changed it about and struck out certain portions and added certain portions to the petition as filed.

"Q. Now in your former testimony to which we have referred you were asked this question:

'Q. And did you prepare the petition for the incorporation of the North Georgia Electric Membership Corporation?'

And to which you appear to have answered:

'A. Yes, sir. Mr. Blackburn, Attorney for the Rural Electrification Administration, sent me a draft that followed somewhat the form of application for charters used in the mid-west, and in other states, and then also there [fol. 648] was one form furnished me, a copy, rather, of an application for charter of some corporation in Tennessee, from Meigs County, or some other corporation, and from those he made suggestions; then I took his suggestions and

took those petitions and whipped them into one that would conform to the law of Georgia, and made the application.'

Is that correct?

A. Yes, that is substantially correct."

Mr. Blackburn was counsel for the REA and was present at the meeting in April, 1936. His office at that time was in Washington, D. C. When I talked to him on April 6 he had just come from Washington and was down here I believe temporarily. Later on I forwarded it to him addressed at Knoxville. The address used at Knoxville was in care of the TVA, where he got his mail.

Complainants' Exhibit 383, the copy of the assignment of the promoters' agreement to the North Georgia Electric Membership Corporation, was prepared by me. If it was submitted to the TVA for approval, I do not recall it. It could have been, but I don't think so. The contract was pursuant to the Promoters' Contract. The construction contracts between the North Georgia Electric Membership Corporation and TVA of June 15, 1936, and August 24, 1936, were not prepared by me. Both of those contracts were prepared and submitted by TVA. Complainants' Exhibit 384, which is the map attached to the June construction contract, was prepared by TVA.

The power contract dated June 15, 1936, between TVA and the North Georgia Electric Membership Corporation, with attached schedules and rates and charges, was not prepared by me, but was presented by me to the Board of Directors of the North Georgia Electric Membership Corporation. The contract of September 2, 1936, between TVA and the North Georgia Electric Membership Corporation, was not prepared by me. I merely examined it and sent it [fol. 649] back again. The application for a loan, of which I did not have a copy, was prepared by me. I received some assistance in its preparation. I did not merely follow a form submitted to me. In answer to the question from whom did I receive assistance, the application was in the form of a letter and T. R. Hunnicutt of TVA looked it over and gave me some suggestions about it. I do not recall that anyone else assisted in the preparation of the application. None of the officers of the Corporation assisted in the preparation of it. I don't think Mr. Bandy assisted in the preparation of the contract or had anything to do

with assisting and supplying the facts. I did not receive any assistance from any attorney for the REA. After the application was prepared, I did not submit it to the Board for approval. I made the application without submitting it to the Board. The application was granted and the construction loan contract of June 15, 1936, between REA and the North Georgia Electric Membership Corporation, was prepared by REA. The construction loan contract of August, 1936, between REA and the North Georgia Electric Membership Corporation, was not prepared by me, but was prepared by the attorney for the REA. I had nothing to do with its preparation, but merely submitted it to the Board. That is also true of the construction loan contract of September 2, 1936, which was also pursuant to the first application for a loan. So far as I know there was only one application made for a loan.

Complainants' Exhibit 386 (excluded by the Court), a copy of the mortgage deed of trust from the North Georgia Electric Membership Corporation to the First National Bank of Dalton, was not prepared by me, but was prepared by the REA attorney. I merely examined it and submitted it to the Board for approval.

[fol. 650] In the preparation of the application for the loan from REA, the County Agents of the various counties made most of the preparation. I don't know whether any of it was done by the TVA or not. I know the County Agents turned over their sheets to Mr. Hunnicutt of TVA, and that information was given to me on the prepared application. Most of it was actually turned over by Mr. Hunnicutt to me and not by the County Agents. Most of it was gotten up by the County Agents before I was employed and these County Agents gave me a little after I was employed, but I think most of it came from Mr. Hunnicutt or through him. I did not state that I was requested by the officers of the Corporation or the Board to prepare such an application. I stated I did not submit the application to the Board for its approval, on the theory that I was requested to go to Washington and was sent to Washington with it. Our engineer, T. R. Hunnicutt, accompanied me on that trip to Washington. He was also employed by TVA but our contract called for them to furnish an engineer as well on the construction.

Complainants' Exhibit 387, the by-laws of the Corporation, were not prepared wholly by me but partly. I re-

ceived assistance and advice in the preparation of the by-laws from Mr. Blackburn of the REA. I cannot say positively whether I received any assistance or advice from TVA or its officers. I think that Mr. Martin of TVA advised with Mr. Blackburn or someone, I cannot say positively. I don't know who prepared Article IV on page 3 of the power contract dated June 15, 1936. That contract provides that the Corporation will not repeal or alter the provisions of Article II, Sections 4 and 6, and Article IV of the by-laws adopted by the Board of Directors of the Corporation during the term of the contract. I don't think it is a fact that those sections of the by-laws were prepared and submitted [fol. 651] by one of the attorneys for TVA. I think they came from the hands of Mr. Blackburn to me and were presented at the meeting at which they were adopted. I don't know what Mr. Blackburn did in connection with those by-laws before they came into my hands, and I cannot say whether they were submitted to TVA for approval. The power contract between the Corporation and TVA, dated June 15, 1936, was not prepared by me but by TVA attorneys and, therefore, TVA must have had a copy of the by-laws to which the contract refers.

The Corporation keeps books of account. They are kept by Mr. Farris Hassler. The superintendent of operations is Mr. John Thigpen. I know of my own knowledge that those books and records are kept in accordance with the request and in the forms supplied by the REA.

[fol. 652] Cross-examination.

(Offered by defendants:)

I participated in the work leading up to the granting of the charter to the North Georgia Electric Membership Corporation. I was joined in that work by a number of farmers in the vicinity. The members of the present Board of Directors and the County Agents of all these counties were the leaders in the movement. In the spring of 1935 some of the citizens of Catoosa County, Georgia, did, by its County Agent, Mr. Nicholson, apply to the Rural Electrification Administration for funds to build approximately 87 miles of Rural Electrification Lines in Catoosa County, Georgia.

I am acquainted with the men who petitioned the Superior Court at Whitfield County, Georgia, for the articles

of incorporation as set forth in Complainants' Exhibit 381. All of them are farmers except two. None of them had electricity on their farms at that time. I have lived in the vicinity of this project all my life. The area covered by the North Georgia Electric Membership Corporation had local service prior to this project. The Georgia Power Company had rendered service for a number of years to the municipalities in this area, but had not rendered service to any farmer or any person living in the rural areas throughout the counties served by the North Georgia Electric Membership Corporation at the present time. The Georgia Power Company has served some of the small co-operatives having a line 3 or 4 miles in length outside the city limits of Dalton and LaFayette. In these instances the farmers themselves owned their own lines and purchase electricity from the municipalities of Dalton and LaFayette, and the services rendered by the Georgia Power Company were wholesale to the cities and no contractual relations existed between it and these farmers who lived along the cooperative lines, all of which were adjacent to the city limits. I am familiar with the electrification of this area and I believe I have given a great deal of study to it during the past year and three months.

There were three REA contracts which were actually project contracts. The August 24 construction loan contract [fol. 653] tract for \$375,000 has figured in it the \$137,400 loan appearing in the June 15 construction loan contract. So when they did not comply with our request and the Rural Electrification Administration had before it the application for a loan from us,—they are all in the same group,—it had before it the application from the farmers of Catoosa County, Georgia, that is at the time our application went there. One part of that application was Catoosa, Georgia No. 7. We were granted our application and some moneys were paid to the North Georgia Membership Corporation. That was the Catoosa County one, but later they agreed that they would pay that whole amount to the North Georgia Membership Corporation. The \$137,400 cash given us was initiated in the spring of 1935 by Mr. Nicholson, the County Agent, and Mr. Bandy, who is the President of the Corporation, and a number of other farmers. As to whether the TVA participated in that work, I don't know of my own knowledge, but as far as I know, it did not. I only know

the first contact I made with TVA. There is a history of other contacts probably preceding that, though I was not present and I know nothing of that of my own knowledge. I went to Chattanooga at the request of the County Agent of this County and the County Agent of Murray County, Georgia, in one of their cars, but I could not state whey they told me. When they came and told me they were going I went to Chattanooga with them and there was a meeting there of the County Agents of all the counties in this area where we have existing lines, except the agent from the County of Floyd was not present, and each of the agents had with him one or more farmers from his county. This meeting was on April 6, 1936. I don't know who arranged the conference. I did not go at the request of the TVA. I met Mr. Martin, who was with the legal division of TVA, and I met Mr. Hunnicutt, who was a TVA engineer, and [fol. 654] I met a man by the name of John Britton and another by the name of Williams. That is all I can remember. It was at that time that I had my first discussion of the proposed arrangement and possibility of getting TVA power. It was the first discussion I had participated in when any member of TVA was present. Long before that I had discussed the subject with certain County Agents. In the earlier discussions the County Agents came to me for advice on the question as to farmers' cooperatives that were organized in Georgia and farmers' cooperatives entering into contracts with REA for the construction of lines and for rural electrification generally, and that was a point that was brought to me some time before we met in Chattanooga.

The Corporation serves approximately 1600 customers. I know of none who were formerly being served by the Georgia Power Company or any other utility. Our practice in regard to serving customers of the utilities has been not to serve them at all and we are not serving any of them at the present time. As to what the practice in the future will be, of course, I don't know.

In addition to handling local affairs of the Corporation, I have handled a great many of its policy matters and business matters, and I am generally familiar with the business practices and policies of the Corporation and have done more of the work than anyone else. TVA has done things to interfere with the practices and policies of the Corpora-

tion. After the execution of the power contract between the Corporation and TVA, the Corporation began to serve a number of customers in Catoosa County, Georgia. The city of Ringgold built a pumping station outside the city limits. It was a new station that had never been serviced and it applied to us for service. We entered into a contract with the town of Ringgold to furnish it service and after we started furnishing that service, off our main line, TVA objected to it and notified us that the service to us at the [fol. 655] station at Ooltewah would be discontinued if we did not disconnect the pumping station of the town of Ringgold from our line. We did disconnect that pumping station from our line and Ringgold has bought a Diesel motor and independent generating equipment and we now have a claim against TVA for the loss we suffered by reason of having the service suspended with our own facilities. The reasons given as to why TVA would not be willing to furnish that power was that it considered it to be a violation of a separate contract between TVA and Commonwealth & Southern to serve that facility over our lines.

No one connected with TVA has directed me or the Corporation, so far as my knowledge goes, to initiate solicitation with any particular customers. The only solicitation of residential customers on behalf of the Corporation has been on the part of the people themselves who are without electric service. As to industrial customers, the prospects themselves made the first application to our Corporation for rates and schedules, except that I got hold of some rate schedules myself and handed out about six or seven, so that the industrial customers in this area might know what the rate schedule was. No one with TVA has ever insisted upon the Corporation making such industrial contacts against its policy. TVA did give us assistance in the way of engineering or rate studies in connection with possible industrial customers. I wrote a letter to Mr. Hunnicutt at the Chattanooga office and asked that rate analyses be made for certain named industries in our area. I made such a request in regard to the Yates Bleachery, because some of our customers who resided just a little ways from the station at Ooltewah wanted service, and on account of the lightning and storms over which we had no control affecting the service to those distant customers, we applied to

[fol. 656] TVA by oral request to furnish us a substation more centrally located, and TVA replied that the load did not justify it. We then asked about how much the load would have to be increased in order to justify a high tension line, and the estimate we received was such that if there was placed one large industrial customer in that area, we could get that high tension line. We desired to increase our load so as to amortize our indebtedness to REA more quickly. Subsequent to that request, a study was made of the situation at the Yates Bleachery and I received a copy of the analysis from Mr. Hunnicutt. I thought that the proposed contract could be made an obligation of the Corporation and later I learned from Mr. Carmody, the Administrator of REA in Washington, that that was not permissible. We thought the Yates Bleachery could be served as we understood it had no existing service. We expected this Corporation to contact the Yates Bleachery direct and to take over all the rights and obligations under that sales contract.

Mr. Bandy, the President, and Mr. Johnston, the Secretary and Treasurer, execute contracts on behalf of the Corporation and no one else has that power. The governing board of the Corporation is composed of the President, Secretary and Board of Directors. At the present time there are 7 members of the Board and it has regular meetings. The Executive Board is composed of 4 members that meet twice a month. The regular Board of Directors meets on call, but we have not called one for over 6 months. The President calls the meetings. Usually I do the actual calling or Mr. Hassler, a member, sends notices out under the direction of the President or myself acting for him. Mr. Bandy presides at the meetings. Representatives of TVA very often attended those meetings during the construction period. Since the construction has been over, they do not attend those meetings unless they are invited [fol. 657] and then they don't sit in on the executive activities.

I am retained by the Board as an attorney to look after the various aspects of the corporate business, such as these contracts. I handle all of its legal affairs and a great amount of its business affairs. The Board also employs to carry on the Corporation work a bookkeeper, 2 stenographers and a head lineman, an assistant lineman, a meter

reader and several members of a ground crew. We buy our equipment from jobbers in Chattanooga and Atlanta. The Executive Board passes upon the purchases on the recommendation of the Superintendent and then the Superintendent is directed and authorized to get the lowest bids and make the purchases. Mr. Thigpen makes the arrangements for new rural customers and our linemen connect them up. We carry on our own construction of extensions and our line crew has connected up something like 140 additional customers in the last few weeks. No one connected with TVA directs any of that construction. TVA does make a check-up in connection with the obligations to it under the accounting pursuant to the power contract with TVA.

We made no complaint about these documents being drafted by TVA. I naturally expected TVA would draft them and I read them all over before presenting them to our Board of Directors.

I never heard of any discrimination among private utilities unless it was a secret understanding. I knew that TVA was making contracts of this same nature with rural electrification associations or corporations.

Mr. Bandy has not had any detailed supervision of the business of the Corporation and is not a lawyer. He lives 17 miles from the office on a farm and only attends meetings as a member of the Board of Directors. He is a member of the Executive Board and consequently the onerous details are handled by others.

[fol. 658] Redirect examination.

(Offered by complainants:)

We have a superintendent in charge of the management of the lines who was until recently Mr. Graham. As to whether he is now employed by TVA, I don't know who he is employed by. The last I heard of him he was in Florence, Alabama. If TVA owns the distribution system in Florence, he might be there at the present time. If it does not he must be working for the City of Florence. As to whether he was employed by TVA prior to his employment by the Corporation, he was superintendent of the cooperatives down in Alabama or Mississippi, according to what he stated in his application. I don't recall that he made the statement when he testified in another proceeding that his

last employment was with TVA, though I was present when he gave his deposition.

The letter (offered and received in evidence as Complainants' Exhibit 389) is the letter dated March 31, 1937, which as I have testified was sent by me to T. R. Hunnicutt, Division Manager of TVA.

(The witness was excused.)

[fol. 659] (The deposition of A. B. Haswell is as follows:)

A. B. HASWELL was called as a witness on behalf of the complainants and, having been first duly sworn, was examined and testified as follows:

Direct examination.

(Offered by complainants:)

I live in Birmingham and am Assistant Vice President in charge of the engineering and construction of the Tennessee Coal, Iron & Railway Company. My company has been in the market recently for a large quantity of power. We have had inquiries from a power producing concern with respect to furnishing us our required quantity of power. On June 2, 1937, we had a long distance call from Mr. Derry of TVA who was at that time in Chattanooga. He discussed briefly the serving of power to us on a small operation up in Tennessee, at our Universal Exploration Company, which had some time ago communicated with TVA about obtaining power information as to that project. We discussed that project and he told me he had understood down at Birmingham, as I recall, a few days previously, that we were in the market for a large block of power and that they would be glad to figure with us on it. He said that their intention was to figure it further and I really did not answer his question relating to the Tennessee proposition. He finally asked me if he could call me within a couple of weeks and find out the status of the whole situation and I told him surely he might and that we would be glad to talk to him. In about two weeks he telephoned me again, I presume from Chattanooga, and asked me the status of it, and I discussed the project up in Tennessee with him in a general way. He

wanted to know what had been done with the program pro-[fol. 660] posed. That, however, was after the time we had already signed the contract with the Alabama Power Company.

We were in the market for a large block of power at the time Mr. Derry discussed the matter with me. That block of power was a minimum of 31,000 kw. and a maximum of 70,000 kw. and was for our works in the Birmingham district and in the entire system, all of which are interconnected.

Cross-examination.

(Offered by defendants:)

I did not bring the contract with me. Our company is a subsidiary of the United States Steel Corporation and the Universal Exploration Company is a subsidiary of our company.

I don't know whether it is correct or not that a substantial period before this discussion our people had gone to TVA and made inquiry regarding the possibility of obtaining power for the plant of the Universal Exploration Company. When I said "our people", I spoke of the Steel Corporation. The Steel Company did not take over the Universal Exploration Company until a short time ago. I am not familiar with what transpired before the time the Steel Company took over that Company and the history as I got it was that there had been negotiations with TVA regarding the possibility of obtaining power for the plant of the Universal Exploration Company. It was looking toward the possibility of TVA furnishing power after the expiration of the contract which the Universal Company then had. I don't know what Mr. Derry's particular object was for his call on June 2. Mr. Derry talked with me about the Universal Exploration matter at that time. I did not tell Mr. Derry that I expected to have occasion to take on power for the new plant of the Tennessee Coal, Iron & Railroad Company in that conversation. It was discussed by him but I did not answer that question at all in connection with taking [fol. 661] power for the Birmingham plant. If I remember correctly, I said in answer to that, "You can hear anything on the street", or words to that effect. He said he had heard that and I passed it off in that way to the best of my recol-

lection. In the conversation a couple of weeks later I told him the other arrangement was made and that ended it and he did not ask us to break our contract.

(The witness was excused.)

(The deposition of T. L. Bonner is as follows:)

T. L. BONNER was called as a witness on behalf of the complainants, and having been first duly sworn was examined and testified as follows:

Direct examination.

(Offered by complainants:)

I am 38 years old, reside in Fayetteville, Tennessee, and run an electrical and plumbing shop. In connection with my electrical business I wire houses for electricity. Over a period of several months or more I have wired many houses in Lincoln County which were going to get electricity from TVA over the lines of TVA. I have wired a house for electricity from TVA where the customer purchased a range or an electric water heater.

The mimeographed form marked "TVA 211 DE, Tennessee Valley Authority, Chattanooga, Tennessee", (offered and received in evidence as Complainants' Exhibit 394), is a form that I fill out in applying for allowances for wiring. The allowances by TVA for the cost of wiring a house for a customer come through the TVA office here in Fayetteville. I procured this form from the TVA offices in Fayetteville. I have at times in the past filled out these forms and handed them to the TVA office here. I have received from TVA [fcl. 662] payment of the cost of wiring houses where a range or water heater or both were installed.

The check of TVA No. 861,381, dated July 21, 1937, payable to my order in the amount of \$15.00 (offered and received in evidence as Complainants' Exhibit 395), was received by me and is a part of the payment of the wiring bill on the house of Robert Lee Farrar. I completed that wiring job approximately a month ago.

The slip marked "TVA 1034-C" and in the middle in bold type the words "Remittance Advice", (offered and received

in evidence as Complainants' Exhibit 396), came to me in connection with the check and in the same envelope with the check.

The brown envelope (offered and received in evidence as Complainants' Exhibit 397), in the upper left-hand corner of which appears the words "Tennessee Valley Authority, Knoxville, Tennessee," and the postmark "Knoxville, Tennessee, July 21, 1937," is the envelope that the check and remittance advice came in.

I have at other times after wiring houses or residences in this county and installing ranges or water heaters received like refunds from TVA which was applied on the cost of the operation. Those payments I credited to the customer's cost of wiring the house.

Cross-examination.

(Offered by defendants:)

I am not employed regularly by either TVA or the Power Company. I am an independent contractor. I have now and have had since March of this year an agreement with The Tennessee Electric Power Company to do all their house wiring.

They pay the whole cost. They do not limit it to \$15.00. By "they" I mean The Tennessee Electric Power Company. It pays the whole cost on appliances, water heaters and the wiring of meter boxes.

[fol. 663] I have been engaged in my present business in Fayetteville about four years and have observed that the installation and use of electrical appliances, such as refrigerators, ranges and hot-water heaters, increase the consumption of electricity.

The business I get is over the lines of both TVA and the Power Company and I know generally where they are located. I do not know of any lines that were constructed by TVA which are located in instances parallel with or duplicate the lines of the Power Company, covering the same general area or running towards the same customers. The lines that were constructed by TVA are in new territory not previously served.

(The witness was excused.)

(The deposition of J. F. Towry is as follows:)

J. F. TOWRY was called as a witness on behalf of the complainants and, having been first duly sworn, was examined and testified as follows:

Direct examination.

(Offered by complainants:)

I am 36 years old and reside in Fayetteville and am a farmer. I ran the Towry electrical shop until I sold out, but I do not run it at the present time. I sold the electric shop on February 1, 1937. While engaged in operating the Towry electric shop, I wired houses in Lincoln County that were to receive electricity over the lines of the TVA. I could not give the exact number of those jobs which I have done, but it is approximately 75. I have wired houses for ranges or water heaters. Complainants' Exhibit 394 is the form which I followed in wiring a house where a range or [fol. 664] water heater or both were installed, and when I turned those forms in, I would receive from TVA payments to be credited on the cost of the job. When I first learned of this arrangement whereby this money would be refunded, I was wiring a house for a Mr. Hogden and a lady, I cannot recall her name, came out on the job and talked to me about the arrangement and that they would pay \$15.00 on a range or water heater which was installed. I do not know by whom the lady was employed. She said she was employed by TVA which proposed to build the line. I would not say that she told me she was employed by TVA. I don't know whether that was a Miss Stewart who is now Mrs. Gertrude Flautt. She appeared at the Hogden home when I was wiring the house. I saw this young lady on other occasions when I was wiring houses. I just met her at various places on the road, but I had no appointment with her at all. She would usually stop at various residences and talk with the housewife.

I talked with TVA employes about the installation of water heaters and ranges in these houses. I talked with Mr. Metcalf and Mr. Peavey. Both of them were with TVA. I also talked to Mr. Rogers of TVA. I do not recall being out on any other wiring job where any employee of the TVA would appear and talk with me about the installation of the ranges or water heaters.

Cross-examination.

(Offered by defendants:)

During my wiring work I would get around the territory a good deal and would see where these lines were constructed by TVA. I suppose those lines were located in new territory and I did not see any Power Company lines right along there in the same territory. I did wiring work for the Power Company at the time I was in business. It [fol. 665] paid for all the inside wiring on all major appliances, ranges, water heaters and other things. I do not know how much electricity the different homes consumed. I am a member of the Lincoln County Electric Membership Corporation and I get rural service now. I was not out in the rural section before the Corporation was organized but moved there the first of 1937. The place where I am now located did not have any service before the Corporation was organized.

(The witness was excused.)

(The deposition of E. W. Carmack is as follows:)

E. W. CARMACK was called as a witness on behalf of the complainants, and having been first duly sworn was examined and testified as follows:

Direct examination.

(Offered by complainants:)

I am 38 years old, reside in Murfreesboro, Tennessee, and am publisher of a newspaper. I am Secretary of the Middle Tennessee Electric Membership Corporation. As Secretary I have custody of the books and records of the Middle Tennessee Electric Membership Corporation. I do not personally keep the books but I have official charge of them. I am one of the original incorporators of that Electric Membership Corporation and I have produced here its records and books.

The minutes (offered and received in evidence as Complainants' Exhibits 398 to 406 inclusive) are the minutes of the meetings of the Directors of the Middle Tennessee Elec-

tric Membership Corporation of June 24, 1936 (Exhibit 398), November 4, 1936 (Exhibit 399), November 13, 1936 [fol. 666] (Exhibit 400), March 4, 1937 (Exhibit 401), March 17, 1937 (Exhibit 402), April 6, 1937 (Exhibit 403), June 4, 1937 (Exhibit 404), June 16, 1937 (Exhibit 405), and July 8, 1937 (Exhibit 406).

I have produced a copy of the certificate of incorporation of the Middle Tennessee Electric Membership Corporation (which appears in the record as Complainants' Exhibit 688); a copy of the contract for power dated August 13, 1936 between TVA and the Corporation (which appears in the record as Complainants' Exhibit 138); and a copy of the construction loan contract dated October 16, 1936 between REA and the Corporation. There are no other contracts in existence between REA and the Corporation.

The document (offered and received in evidence as Complainants' Exhibit 407) is a copy of the by-laws of the Middle Tennessee Electric Membership Corporation.

The document (offered and received in evidence as Complainants' Exhibit 408) is a copy of an application made by the Middle Tennessee Electric Membership Corporation to the REA for a loan.

Cross-examination.

(Offered by defendants:)

Mr. Hutchinson, President of the Corporation, executed the construction contract with TVA and the construction loan agreement of the REA on behalf of the Corporation. They were considered by the Board of Directors and the President was authorized to execute them by the Board. There was a Board resolution to that effect and the contracts were turned over to counsel for the Corporation for examination and approval in every case before being executed. I have available copies of the Board resolutions [fol. 667] authorizing the execution of these contracts. Prior to executing these contracts the Corporation authorized their execution by Board resolutions and discussed them with counsel and had them examined by counsel before they were executed.

I have lived in this County for three and one-half years. Before that I lived in Maury County. During the time I have been here, I have had the opportunity to become ac-

quainted with rural electrification service in the rural areas of this section. Prior to the formation of the Middle Tennessee Electric Membership Corporation, there were considerable areas in this County that were not receiving electric service. Those were the same areas which are now being served by the Corporation. I am familiar in a general way with the location of the lines now operated by the Corporation. To the best of my opinion in talking to those people who now have service from our Corporation, those lines are located in territory that was not previously served by any power company. None of the members of the Corporation were served by The Tennessee Electric Power Company prior to the organization of the Corporation, according to my investigation.

As to what contacts the Corporation has had with representatives of TVA within the past six months, we have invited some of the employees working for TVA to come to our directors' meeting occasionally. The Board of Directors of the Middle Tennessee Electric Membership Corporation makes the determination as to whether or not the Corporation is going to build a line to a particular community and the Board does not take orders on that from any outside agency. The Corporation now has approximately 210 miles of lines in operation and had about 706 customers when I last checked it fifteen days ago.

(The witness was excused.)

[fol. 668] The Court having excluded the deposition of R. H. Bandy on the grounds that it "deals solely with operations by or competition with the Georgia Power Company" later stated:

"The Court has given further consideration to the offering in evidence by complainants of the deposition of the witness R. H. Bandy. It is not controverted here that the North Georgia Electric Membership Corporation operates in Georgia and operates some miles of electric line in Tennessee. So far as this operation is material as evidence of competition by the TVA with any complainants other than the Georgia Power Company it is not necessary further to prove the operation. As bearing upon the competition of the Georgia Power Company, the deposition falls within

the ruling of the Court as to inadmissibility of evidence dealing with operations by and competition with the Georgia Power Company. As evidence of the organization, method of operation and activity of a cooperative within this territory, it is purely cumulative in view of the admission of the depositions of the witnesses Pittman and Carmack. The Court adheres to its ruling that the entire deposition of the witness Bandy is excluded."

(The excluded deposition of R. H. Bandy is as follows:)

R. H. BANDY was called as a witness on behalf of the complainants and, having been first duly sworn, was examined and testified as follows:

Direct examination.

(Offered by complainants—excluded:)

I live in Catoosa County, Georgia, and am President of the North Georgia Electric Membership Corporation, which office I have held since its incorporation. I hold no other office with the Corporation. I am also a member of the *Executive Committee and one of the Directors* of the Corporation.

I attended a meeting in Chattanooga at the TVA offices about April 6, 1936. At that meeting there was pre-[fol. 669] sented a form of agreement between TVA and the promoters of the North Georgia Electric Membership Corporation. I suppose the Corporation was organized sometime subsequent to that meeting,—I didn't keep the dates,—I was not in it. I signed all of the contracts, papers and documents which the Corporation entered into relating to various subjects and which were produced by Mr. Pittman. Mr. Pittman is our attorney. Mr. Pittman got them and studied them and I had to make a living some other way. I did not go to the trouble of informing myself about what they were. That was Mr. Pittman's duty. He got all of these documents, looked them over, stated what they were and I signed all of them I reckon. In each case, Mr. Pittman explained what the contracts were about to the officers and directors and he read some of them, but I did not take time to study them. I don't know very much about them. I read some of the contracts which I signed, but I could not state what contracts, if any, I read before

I signed them. I testified in a suit between the Georgia Power Company and the North Georgia Electric Membership Corporation about September 1, 1936, that I read some provisions of some of the contracts but I did not read any of them through. Concerning whether I was not right in my testimony there or whether I want to change my answer as to whether I read any of the contracts which I signed, I read some parts of them—I don't know that I read them all. As I stated, I depended upon Mr. Pittman to kind of keep us straight. To a great extent I took Mr. Pittman's word with respect to what contracts I should execute. I don't know whether or not Mr. Pittman prepared or drafted any agreements or contracts which I signed.

[fol. 670] Cross-examination.

(Offered by defendants—excluded:)

The contracts would be presented at the meeting and at that time Mr. Pittman would explain and discuss the terms of the contract. I read a portion of them after the discussion and explanation by Mr. Pittman and upon the recommendation of Mr. Pittman and the consideration of them at the Board meeting, I signed them.

(The witness was excused.)

(The excluded deposition of Mrs. Nellie Armington is as follows:)

MRS. NELLIE ARMINGTON was called as a witness on behalf of the complainants and, having been first duly sworn, was examined and testified as follows:

Direct examination.

(Offered by complainants—excluded:)

I live in Birmingham and am employed by the Alabama Power Company and was so employed on May 6, 1936. On that night I attended a public meeting at Cullman, Alabama. I am Secretary to the Engineer of Power Sales, Mr. T. L. Bissell, of the Alabama Power Company. I have

studied typewriting. I completed my commercial course in Bellgrade Business College at Bellgrade, Kentucky. I received my B. C. S. degree in commercial work there in 1924. Then I taught commercial work in the Cullman County High School two years. By commercial work I mean shorthand, typewriting, bookkeeping and business arithmetic. [fol. 671] I then taught at the Wheeler Business College in Birmingham. Next I did some statistical work for the Tennessee Coal, Iron & Railroad Company in Birmingham and I did some stenographic work for R. A. Brown Insurance Company in Birmingham. I went with the Alabama Power Company in March, 1927, and I have been there ever since engaged in stenographic work.

At the meeting at Cullman, Alabama, which I attended on May 6, 1936, the discussions were on Rural Cooperative Associations. Speeches were made there at that time and I took down those speeches in shorthand. Mr. Beauchamp, Dr. Falck, Mr. Clement and Mr. Nichol made speeches on that occasion. Mr. Nichol is the Mayor of Athens. I took down as much of everything that was said as I could possibly get. Mr. F. F. Beauchamp made a speech on that occasion and I took down as much of his speech as I could get. I later transcribed my notes.

The transcript of my notes (offered in evidence as Complainants' Exhibit 390) contains the speech of Mr. Beauchamp on p. 1; the speech of Mr. Nichol on pp. 2 and 3; the speech of Mr. Sears on pp. 4 and 5; the speech of Dr. Falck on pp. 5 and 6; and the statement of Mr. Nichol on pp. 6, 7 and 8, including the questions asked Mr. Nichol by members of the audience and his responses. (Complainants' Exhibit 390 was excluded by the Court and exception taken by complainants.)

Cross-examination.

(Offered by complainants—excluded:)

The meeting about which I have testified was a meeting of the Cullman County Cooperative Association and was presided over by Mr. Clement. Mr. Clement was Chairman of the meeting and I understood he was President of the Cooperative Association.

(The witness was excused.)

[fol. 672] (The excluded deposition of Chester Gause is as follows:)

CHESTER GAUSE was called as a witness on behalf of the complainants and, having been first duly sworn, was examined and testified as follows:

Direct examination.

(Offered by complainants—excluded:)

I live in Birmingham and am employed by the Alabama Power Company. I was employed by it on May 6, 1936 and December 12, 1935, and have been employed continually by it since December 12, 1935 as Power Sales Manager.

On March 9, 1936, I attended a meeting of the City Council of Cullman at which Mr. F. F. Beauchamp was present. The first time I saw Mr. Beauchamp was at this meeting, when he and Dr. Edward Falck appeared before the City Council. Dr. Falck is Director of Rates, Research, and Economics for TVA. The occasion for this meeting of March 9 was that there was to be a discussion by the City Council of Cullman. T. L. Bissell and W. M. Stanley of the Alabama Power Company were at that meeting too. They have to do with the sale of power. At that same meeting Mr. F. F. Beauchamp and Dr. Edward Falck of the TVA and Mayor J. H. Dunlap made some suggestions and representatives of TVA were heard first. Mr. F. F. Beauchamp spoke to the Council and discussed the matter of TVA supplying the City of Cullman with power. He said that TVA was interested in serving Cullman's electric load, but TVA could not make a definite proposition at the time on account of the Court's injunction. He then said Dr. Edward Falck could explain the rates and the program of TVA. Dr. Falck then made a statement to the Council with respect to the [fol. 673] manner in which TVA could supply power and the rates to be charged and he discussed the contract that the City would enter into to obtain TVA electric service.

I attended a meeting of the Cullman County Rural Electrification Association on May 6, 1936 at which Mrs. Armington was present. Mr. F. F. Beauchamp, William Nichol and L. A. Sears were also present. I arranged to have the speeches taken down in shorthand by Mrs. Armington, my stenographer, and I took her to Cullman with Mr. Bissell

on that occasion. Mr. Beauchamp, Mayor Richardson of Athens, Alabama, Mr. Sears, Mr. Nichol and Dr. Edward Falck made speeches on that occasion.

Redirect examination.

(Offered by complainants—excluded)

In explanation of my statement in cross-examination that we went to the Cullman County meeting to get evidence I mean simply this: We desired to know the extent to which the Cooperatives intended to build lines to the City of Cullman and we desired a transcript of the meeting and Mayor Dunlap advised me that this meeting was going to be held and that is my reason for going. I examined Mrs. Armington's transcript of her notes on this Cullman County Meeting of May 6, 1936, and made no changes in them. I heard the speeches which she reported in her transcript. As I recalled at the time I examined the transcript, the speeches made were substantially as I found them in the transcript.

(The witness was excused.)

[fol. 674] (The excluded deposition of Quincy Caughman is as follows:)

QUINCY L. CAUGHMAN was called as a witness on behalf of the complainants and, having been first duly sworn, was examined and testified as follows:

Direct examination.

(Offered by complainants—excluded:)

I live in Birmingham, Alabama. I am employed by the Alabama Power Company and was so employed on November 5, 1935. On that date I attended a public open meeting at Altoona, Alabama, in Blount County. I would estimate there were approximately 400 or 500 people present. Congressman Starnes of that District and Mr. Rogers and Mr. J. H. Aldridge were present at that meeting and made speeches. I did not know Mr. Aldridge before that time, but both he and Mr. Rogers were introduced by Congressman Starnes. Mr. Rogers made a speech as to TVA. The

primary purpose of the meeting was a discussion of TVA and the proposition to form a cooperative in Etowah and Blount Counties. Mr. J. H. Aldridge made a speech. Mr. Starnes spoke first and he, in turn, introduced Mr. Rogers, who explained to the people how to go about forming a cooperative and all about what they would have to do and the requirements for these cooperatives. He discussed the operation from a cooperative standpoint, and he discussed the Alcorn County Cooperative in Mississippi. Mr. Aldridge stated in his speech that he was with TVA, but I do not recall what he stated his business was. He stated he was a native of Blount County and was especially interested in Blount County and in forming these cooperatives. I don't believe he stated anything with respect to the willingness and ability of TVA to supply power to cooperatives there.

(The witness was excused.)

[fol. 675] (The excluded deposition of R. C. A. Kittridge is as follows:)

R. C. A. KITTRIDGE was called as a witness on behalf of the complainants and, having been first duly sworn, was examined and testified as follows:

Direct examination.

(Offered by complainants—excluded:)

I live in Gadsden, Alabama, and I am now in the employ of the Alabama Power Company as District Manager at Gadsden. I was so employed on June 4, 1936, on which evening I attended a meeting at the high school at Turkeytown, Etowah County, at which there was a discussion of rural electrification of that County. It was an open public meeting and there was a discussion with reference to the formation and organization of a county cooperative. I know Mr. B. S. Robinson and he was present at that meeting. I never saw him until that time. I met him at the meeting when he came up to me and said: "Have I not seen you somewhere before?" and I said, "You might have—my name is Kittridge and I work for the Alabama Power Com-

pany," and I shook hands and went back. At the meeting he made a speech discussing the organization and formation of electric membership corporations. He passed out some inquiries in printed forms to members of the audience and to me, and explained those forms to the audience and told them that the forms would be available whenever they had perfected their organization. I noticed that the forms which he had were application blanks and service sheets, and he said that he would see that there would be some handy whenever they were needed. He gave me copies of those application blanks and the other papers about which I have testified.

[fol. 676] The paper (offered in evidence as Complainants' Exhibit 391) is headed "Rural Electrification Survey, Neighborhood Plan, Customers' Application Agreement". In the left hand corner appears "TVA 189-DE". (Complainants' Exhibit 391 was excluded by the Court and exception taken by complainants. An identical sheet was subsequently received in evidence as part of Complainants' Exhibit 918.)

The paper (offered in evidence as Complainants' Exhibit 392) is a form which was passed out at that meeting headed "Rural Electrification Survey, Neighborhood Plan, Canvasser's Mileage Sheet", bearing in the corner "TVA 231-DE". (Complainants' Exhibit 392 was excluded by the Court and exception taken by complainants. An identical sheet was subsequently received in evidence as part of Complainants' Exhibit 918.)

The pamphlet (offered in evidence as Complainants' Exhibit 393) entitled "Rural Electrification Survey, Neighborhood Plan, Information Sheet" was also handed out at the meeting. (Complainants' Exhibit 393 was excluded by the Court and exception taken by the complainants. An identical sheet was subsequently received in evidence as part of Complainants' Exhibit 918.)

(The witness was excused.)

[fol. 677] COLONEL WILLIAM KELLY was called as a witness on behalf of the complainants and, having been first duly sworn, was examined and testified as follows:

Direct examination:

I reside in Buffalo, New York, and I am President of the Buffalo, Niagara & Eastern Power Corporation. I received

my preparatory education in the public schools of Yonkers, New York, and Superior, Wisconsin; my technical education at Sheffield Scientific School of Yale University and the U. S. West Point Military Academy. I graduated from West Point in 1899 with the degree of Bachelor of Science. I subsequently took a post graduate course in the Engineers School of Application at Washington. I belong to the American Society of Civil Engineers, the American Society of Military Engineers, the Association of Applied Sciences, and I am a fellow in the Institute of Electric Engineers, and a past president of the Buffalo Society of American Civil Engineers. I am a licensed professional engineer in New York State.

I was commissioned a lieutenant of the Corps of Engineers, U. S. Army, upon graduation. My first assignment was on fortification work at San Francisco, building defenses at the entrance to San Francisco Harbor. From there I went to the Philippines and spent approximately three years, mostly on military engineering, and during that time I made a survey of the Harbor of Ilo Ilo and plans for its improvement. Upon returning to the United States, I entered the Engineers School of Application in Washington. From there I went to New London, Connecticut, as assistant to the U. S. Army Engineer in charge of that district. That district was engaged in building defenses at the eastern entrance to Long Island Sound, and in making river and harbor improvements on the north shore of Long Island [fol. 678] Sound from the New York State line up to the Atlantic Ocean. I had charge of the fleet work in that district, and, among other things, a considerable floating plant to operate. From there I went to Fort Leavenworth on military duty and subsequently to San Francisco. In 1906 I went from San Francisco to Washington as assistant to the engineer commissioner of the District of Columbia in charge of the departments of sewers, water, buildings and electricity and spent four years on that job. I then went to the Philippines again for about three years, engaged most of the time on the building of defenses at the entrance to Manila Bay. Upon return from the Philippines in 1913, I was assigned to duty as assistant to the Chief of Engineers in Washington. I retained that position until I went to France in the War.

During the War my services consisted in, first, serving on the general munitions board in Washington; subsequently

as chief engineer of the 42nd Division, chief engineer of the Fourth Army Corps; base commander of base sections 9 and 7 in France, and deputy chief of staff of the American Expeditionary Forces in France. I was awarded the Distinguished Service Medal for services during the War, and also the Legion of Honor of the French Government. While in France, I was delegated to duty with the Peace Commission to make a survey of the five rivers internationalized by the Versailles Treaty. My duty consisted in making an inventory of the floating plants and river and harbor improvements on these rivers for the use of an American arbitrator who was to make an allocation of these in accordance with the new boundaries fixed by the Treaty.

Upon return from France, I was assigned to duty on the California Debris Commission. Among other things, I had charge of the flood control projects and navigation improvements on the Sacramento River. In 1920 I was appointed chief engineer of the Federal Power Commission and served in that position for five years. After being relieved from [fol. 679] that, I was granted an extended leave of absence and became directing engineer of the National Electric Light Association. In 1926 I became vice-president and chief engineer of the Buffalo, Niagara & Eastern Power Corporation. In 1929 I became general manager of that corporation and in 1933 I was elected to the present position I now hold, that of president of the Corporation.

I resigned from the Army in 1928. After 1924 I was a member of the Joint Engineering Board on the St. Lawrence project, and I was also chairman of the Board of Engineer Officers that reported on the use of the reservoir for flood control on the Mississippi in 1927 to 1928. After the 1927 flood, there was a great deal of agitation about the Mississippi flood condition. General Jadwin, who was then Chief of Engineers, started a very thorough investigation to make recommendation to Congress as to what should be done. The question of reservoirs had been studied from time to time for 85 years or so. But, in view of changing conditions, General Jadwin thought that it should be reviewed and a determination made as to whether or not reservoirs on tributaries should form a part of the main project. He appointed a board of seven engineer officers, of which I was chairman. The time allowed was very short, because Congress was insisting on having another report. But, the Board had placed at its disposal all of the facilities of the

Corps of Engineers, and they made an investigation of a good many reservoir sites, and made a report on the subject which was published in a Committee document, No. 2, 70th Congress, First Session. I personally directed the work on this Board.

The flood control project on the Sacramento River was on a much smaller scale, of course, because the river is smaller and very much like the project that was adopted for the Mississippi River in what is called the Jadwin plan. It consisted in a leveed channel on the main river with by-[fol. 680] pass flood channels to carry the water which should come beyond the capacity of the main channel.

My principal duties as chief engineer of the Federal Power Commission were to examine the applications that came before the Commission, and determine the action that should be taken upon them by the Commission, and recommend to the Commission what action it should take. The principal function in carrying out that work was to conform with section 10-A of the Act, which charged the Commission with the duties of satisfying itself that any project for which a license was granted was in conformity with the complete development of the water resources and would lead to the ultimate maximum public use of those water resources. During the five years that I was with the Commission, there were about 600 applications made to the Commission and the Commission granted 83 licenses for power development, which covered an installed capacity of about 2,650,000 horsepower.

During the period from 1920 to 1928, my work and my studies were not confined to projects in any particular part of the United States. I was connected with projects that were pretty well scattered over the entire United States during that time. During the time that the Jadwin plan was being formed, General Jadwin called me into consultation on it a good many times and I was quite familiar with that plan. Prior to that, while I was in the office of the Chief of Engineers, as assistant on the River and Harbor desk, I had a good many occasions when I had to pass on projects connected with the previous plans on the Mississippi River. During the time I was an assistant to the Chief of Engineers, I was principally engaged on navigation projects of one kind and another. That is, I was an assistant to the Chief on what they called the River and Harbor desk, which is a [fol. 681] branch of the Chief's office, which handles all

water power problems. The projects which came within the field of my duty as assistant to the Chief of Engineers involved projects for both the Mississippi and Tennessee Rivers.

Since I resigned from the Army in 1928, I have kept in touch with the work that has been done and studies that have been made in connection with flood control on the Mississippi River, by reading the various reports that came out since that time and by conversation with officers of the Corps of Engineers that were engaged on the work. I am personally familiar with the general topography of the lower Mississippi Valley. I have visited that section a number of times since 1913. I have been in the Valley at practically all stages of the river, from low water to flood, and I have been down the river at one time or another practically all the way from St. Paul to the Passes. I am familiar with the reports that have been made by the Engineer Corps in the last five years relating to floods on the Mississippi River and its principal tributaries. I am also familiar with the general program of the TVA, the so-called TVA Unified Plan, as it is set out in the report of the TVA to Congress under date of March 31, 1936. I have visited all of the projects on the Tennessee that are included in that plan, including the sites that have been recommended or considered. I have had some contact with Wilson Dam long before the TVA existed. I saw it under construction, and after it was constructed.

The drainage basin of the Mississippi covers an area of about 1,240,000 square miles. It covers parts of about thirty-one states and a couple of provinces in Canada and it occupies about 41% of the area of the United States. The map, (offered and received in evidence as Complainants' Exhibit 409) shows the Mississippi drainage basin divided amongst its principal tributaries, each tributary being shown by a different color. The lower Mississippi Valley, [fol. 682] which is the general point of interest for flood control, from Cairo down to the Gulf, is shown in dark blue, and the other part of the main valley, which is usually referred to as the middle section of the Mississippi, is shown in lighter blue. The Ohio drainage basin, which includes the Tennessee, occupies about 16% of the drainage basin. The Tennessee basin is about 3.3% of the total drainage basin. The lower Mississippi Valley from Cairo to the Gulf, which is about 900 miles, following the river, occupies an

area of about 50,000 square miles. In original condition, about 30,000 square miles of this area were subject to inundation. The construction of levees and other improvement works in the river have reduced that amount of overflowed land to about 10,000 square miles, or it will be when the so-called Jadwin Plan is completed. And a considerable part of that remaining area, that in the floodways, will only be flooded periodically, on certain—we do not know just what periods, but averaging perhaps once in 14 or 15 years.

The floods on the lower Mississippi, on account of the very large drainage area, receive water from all these tributaries, and that causes them to extend over a very long period. The flood stages in general—they call it a serious flood stage when the gauge at Cairo goes above 50—have lasted in large floods for as long as 30 days, even twice that time in one or two floods. The inflow from the major tributaries is not in proportion to the area of the watershed. The western part of the drainage basin is semi-arid and the run-off from that part of the basin is very much less than it is from the eastern side. It is not usual that all tributaries are discharging at the same high stages. In a river as large as the Mississippi, or even the Ohio, a flood in the Ohio rarely has had, or it never has up to date, all of the tributaries in flood at one time. Usually the flood is caused by one or two or three tributaries, which are receiving a very high run-off. The [fol. 683] others may be at a normal stage or even below a normal stage. The big floods in the Mississippi River usually come between the first of January and the first of June, the first five months in the year. There have been floods that exceeded the flood height in almost every month of the year, except August or October.

Considering the general problem of flood control for the lower Mississippi, the river will carry about a million cubic feet per second within its banks. The main channels have been straightened and levees built in such a way that under the present project the river will carry 1,900,000 cubic feet per second. Anything above that has to be taken care of through these floodways. The maximum flood that is being provided for will be somewhere in the neighborhood of three million second feet.

With respect to the benefits which should result from any project designed for Mississippi River flood control, the obvious thing is that flood control projects must protect against the damages that are done by flood to life and prop-

erty and incidental damages to suspension of business and to the interruption of communications. It should also be dependable in great floods. That is the critical time for any flood proposition. They should also be designed so that the protection is obtained with the minimum cost. In order to achieve these benefits, the works must be designed in accordance with well-tried engineering principles that will give dependable results and the most economical solution that can be obtained. No flood project is of any real value unless it protects against the maximum flood to be reasonably expected.

There are several ways in which estimates of the size of the flood which may be reasonably anticipated on the lower Mississippi River can be made. They have been made a number of times by the Mississippi River Commission and by the Chief of Engineer's office. Usually such estimates are [fol. 684] based on the past records, taking into consideration the topography of the drainage basin, contributions by the different tributaries and various other factors that make it possible to arrive at some idea of what the maximum probable flood will be. In the case of a large river, with a large drainage basin such as the Mississippi, and the diversity factors such as exist in the case of the Mississippi, I think it is possible to make a more reliable estimate than in the case of a smaller river with a smaller drainage basin. Assuming that the works included in the TVA Unified Plan on the Tennessee River and its tributaries were constructed, it certainly would, in my opinion, still be necessary to construct flood control works on the lower Mississippi River to provide adequate flood protection to take care of the maximum anticipated flood.

The map, (offered and received in evidence as Complainants' Exhibit 410), shows the lower valley of the Mississippi from Cairo to the Gulf. The main river and the main tributaries are shown in blue. The principal cities are marked on the map. The main levees are shown in a full red line and the so-called fuse plug levees are shown by dotted red lines. If you will look at the upper part, starting at Cairo, going down the River, you first come to Birds Point, just below Cairo. At that point the dotted red line shows the location of the old levees. The channel capacity between this levee line and the bank on the opposite side of the river is not sufficient to carry the water without excess heights at Cairo. Consequently, the Jadwin plan provided a levee

from Birds Point to New Madrid. The old levee, slightly reduced in height, was left in place. In the ordinary year the river stays within the old levee and the bank on the opposite side. In a flood year, such as last year, the old levee is overtopped, and the river covers the area out to the main levee. [fol. 685] As you go down the river, we come next to the Arkansas river. There the old levee line along the south side of the Arkansas and west side of the Mississippi is shown in a dotted line. A new levee is projected from the high ground at Pine Bluff on the South side of the Arkansas, running down to the vicinity of Harrisonburg, and the levee on the opposite side of this Tensas Bayou forms the floodway. The old levee shown by the dotted line is left in place some three or four feet lower than the main levees. When the flow in the river becomes more than the main channel can carry, this old levee will be overtopped and the water will pass down through this floodway, which is now called the Eudora Floodway. That Eudora floodway is a slight modification of the Jadwin Plan. Originally the Jadwin Plan put the floodway over in the Boeuf River Valley, on the other side of Macon Ridge.

As we go down the river from there, the next point of diversion is in the Atchafalaya River, which is represented by the two red lines close together along the river. There are floodway levees built so as to enlarge this flood channel down the Atchafalaya Valley, and the water comes into that area through a fuse plug levee at the upper end shown by the dotted red line. In addition to these levees, the outlets have been enlarged, one at Morgan City, and the other just west of that. There has also been an outlet provided above New Orleans on the main river called the Bonnet Carre Spillway, which discharges excess water into Lake Pontchartrain, and lowers the flood heights of water passing New Orleans. This, in a general way, comprises what is called the modified Jadwin Plan. The project is pretty well towards completion at the present time. In fact, practically all of it is completed except the Eudora Floodway.

Examination by the Court:

The channel of the river has been straightened in certain [fol. 686] places and dikes are built for the protection of the banks. Sometimes the protective facilities are in the form of a mattress that covers the bank and sometimes there is a dike projecting out into it for the purpose of preventing the

river from leaving its channel. That is one of the integral parts of the Jadwin Plan. The straightening of the river and the protection of the banks constitutes a real part of it, both for increasing the flood capacity of the main channel and for improving the navigation conditions.

Direct examination continued:

When the flow gets to approximately 1,900,000 second feet, it will start running out of the spillways slightly before that stage is reached or that quantity of water comes in. Anything below that would be carried by the main river without going through the floodways. The Atchafalaya probably is an old mouth of the Mississippi. It used to be called the "old river", that joined up with the Atchafalaya there, and I am not certain about the history of it, but it looks as though it might very well have been the original main channel.

Prior to 1928, there had been about \$150,000,000 spent by the Federal Government on the flood control works of the lower Mississippi. The Jadwin Plan, as modified, included certain improvements on the St. Francis and Yazoo basins and will cost about \$500,000,000. It is practically completed, except for the Eudora Floodway. The improvements in the Yazoo and St. Francis basins are not finished yet either. The modified Jadwin Plan does not recognize or include tributary reservoirs as being essential or economical for flood control on the lower Mississippi River. Obviously the protections should not cost more than the benefits to be derived from flood protection.

In my opinion, storage works on tributary streams are not practicable or effective for the control of floods on the lower Mississippi River. That is based on considerable study of the subject. The subject has been up many times [fol. 687] and the fact of the matter is that with all of the studies that have been made, there are no satisfactory reservoirs that have ever been built with that primarily in view. I have studied the effect of a good many tributary reservoirs on the Mississippi River. I might mention the reservoirs of the Miami Conservancy District. Those are detention type reservoirs. That is, they are built so that they automatically fill as the water run-off increases and then discharge themselves automatically after the flood has passed. Detention reservoirs are what you might call fool-proof, and are very effective on a small area. These Miami reservoirs

are very satisfactory as protection for the Miami Valley, including the city of Dayton, but their effect on the Mississippi is very uncertain. What they do is to reduce the maximum outflow from the river, but they increase the duration of the high water period. What the effect is on the Mississippi or some other stream at a considerable distance away depends upon the timing of the water out of that river with water coming from other tributaries. It may decrease the flood height on the Mississippi. Out of five floods that I have studied, in one of them it decreased the flow; in two of them it increased the flow of the Mississippi; and in two it had no effect. There are no power projects operated in connection with these Miami reservoirs. They are empty most of the time.

The size of the drainage basin of the Tennessee River is 40,600 square miles. The flood characteristics of the Tennessee River are not similar to those of the lower Mississippi River. The Tennessee, of course, is a very much smaller stream. The valley has much steeper slopes than the lower Mississippi, and the result is that the floods on the Tennessee are more flashy than they are on the Mississippi. On the upper river, they rarely last more than a few days; in [fol. 688] the lower river, they may last as much as two weeks; whereas, on the Mississippi, the large floods last thirty days or more.

I am familiar with the projects included in the TVA Unified Plan as outlined in its report to Congress of March 31, 1936. I have also examined later information given before the Congressional Committees or in annual reports with reference to its projects. At the time the TVA Act was passed in 1933, there were two dams on the main Tennessee River, Wilson Dam built under the National Defense Act and Hales Bar Dam, which was built by private interests. Starting with the dams included in the TVA Unified Plan that are finished, there are Wheeler and Norris; there are four under construction, Pickwick, Guntersville, Chickamauga, and Fowler's Bend on the Hiwassee. There are others that have been recommended, Gilbertsville, Watts Bar, Coulter Shoals and Fontana.

There is a conflict between storage for power and flood control in the projects included in the TVA Unified Plan. When you are using the reservoir for flood control, the reservoir should be kept empty until the danger period arrives. It should then be filled to reduce the flood waters. As soon as the flood has passed, it should be emptied again to be

ready for the next one. When you use the reservoir for power purposes, the reservoir should be filled as early as practicable and kept full as long as possible for two reasons: first, to conserve the water for the low water period, and second, to get the maximum head out of the reservoir for power purposes. In the case of storage for power, the availability of any capacity for floods is a matter of chance. If you start to fill the reservoir when the high water season arrives, and you need to do that if you are running it as a power project, there may be no capacity left when the large flood really comes along. Whether there is any capacity and, if so, the amount of capacity, is contingent upon the power operations.

[fol. 689] Tributary flood control reservoirs cannot be operated for local flood protection and, at the same time, be operated so as to provide a reduction in peak stages on a distant river into which the tributary flows. If they are operated for local flood protection, they would be used to store water when the local flood came along, and as soon as that flood was passed, they would release it without regard to the conditions in the main river. On the other hand, if they use it for flood protection for the main river some distance away, they would be held empty regardless of local conditions until a dangerous condition or dangerous stage in the main river arrived, at which time they would start storing to protect the main river.

Valley storage is the natural storage of the valley itself as it is filled when the water rises in the flood. It really amounts to having the water as it rises in the river overflow low lying lands, back up into the small creeks, and as it gets higher on a river like the Ohio, for example, it will back up into main tributaries like the Tennessee and the Cumberland, and taken altogether, there will be a tremendous amount of water stored in the valley proper. That storage has the same effect as detention storage reservoirs. It has the effect of holding the water back so as to reduce the maximum crest and the maximum flow at points below, but it also has the effect of extending the period of high water.

The diagram, (offered and received in evidence as Complainants' Exhibit 411), is drawn to show the effect of valley storage, or how the valley storage is affected when dams are placed on the river. On the left, there are three figures showing the valley storage at different stages of

flow. On the right, there is a diagram showing a dam with the dead storage marked in light blue, being that that is below the minimum pool level, and considerable storage is [fol. 690] shown in dark blue, being that storage between the minimum pool level and the top of the gates. If on this longitudinal section of the reservoir, we place the valley storage diagrams on the left, you show in red how much of the valley storage is eliminated by the construction of the dam. That is eliminated because the dam creates this dead storage, which is filled with water at all times, and when a flood comes along, it cannot be filled again. The diagram on the right also shows what will happen to the controllable storage as the river flow increases. The controllable storage is reduced, and if the flow in the river is great enough to drown out the dam, there will be no controllable storage at all. If the river is completely canalized by high dams, it will have lost practically all of the valley storage and all of the benefits of flood reduction due to it.

Complainants' Exhibit 411 indicates that in case a large flood happens, the only value which the dam has from the standpoint of flood protection is the small section marked "Controllable Storage" in the upper left hand corner of the lower right hand figure. That would be a very small proportion of the total storage area of the reservoir. I am speaking of or referring to the TVA Unified Plan when I am making these comments. They would be different for different rivers and different projects. In the 1926 flood, the amount of valley storage on the Tennessee River was about 8,000,000 acre feet. In a large flood, such as may be expected, it would be about 14,000,000 acre feet. Referring to the area on Exhibit 411 marked "Dead Storage", that means that when you build a dam across the river, water forms behind that dam and that pool remains there all the time without any change, and that is what is normally referred to as dead storage, being the part of the storage behind the dam, which is below the spillway. The effect of that reduction in valley storage would increase the stages below the reservoir. The dead storage forms a head for power development.

[fol. 691] The present flood control works system on the Mississippi River at and below Cairo consists of levees and by-pass channels for extremely high floods, and certain other lesser things, like straightening channels, widening

outlets, stuff of that sort. In my opinion, this system of levees and by-pass channels, when completed, will be large enough to take care of the largest flood which may be reasonably anticipated at and below Cairo. The construction of dams and reservoirs, as indicated in the TVA Unified Plan as set forth in its report to Congress under date of March 31, 1936, would not decrease the size or cost of the flood control works which have been adopted and which are nearing completion for flood protection at and below Cairo. In my opinion, no expenditure is justified on the Tennessee River for flood protection on the Mississippi River at and below Cairo. There comes a point in the case of any large river where it is cheaper and better to get the water to the sea than to hold it back in reservoirs. A river like the Mississippi has so much water coming into it, it is impossible to hold it anyway, and the best thing to do with it is to open up the natural drainage channels and drain it off. Prior to 1928, there had been about \$150,000,000 spent on the Mississippi flood control works. The Jadwin Plan, as modified and when fully completed, would cost about \$500,000,000, in addition to the \$150,000,000.

I am familiar with the low dam program for the improvement of navigation on the Tennessee River as outlined in House Document 328, 71st Congress, Second Session, adopted in the Rivers and Harbors Act of 1930. This document contemplated the building of about thirty low dams in addition to the navigation works already in the river, to produce a nine-foot channel from Knoxville to the mouth of the river. I am familiar with the navigation channel between the mouth of the Tennessee River and Knoxville which would result from the completion of the TVA Unified Plan. [fol. 692] There are already in existence Lock and Dam No. 1, just below Wilson—Wilson Dam and Hales Bar Dam, which will all be a part of the navigable channel either under the low dam navigation plan or under the TVA Unified Plan. Then, there is Colbert Shoals, Riverton Lock and Widows Bar Dam which would be in the low dam project as well. In my opinion, there is no material difference from the standpoint of practical navigation between the benefits to navigation under the two plans. One of them has certain features that the other has not; and the other has advantages that the first has not, and when you balance it off, I believe that the practical navigator would find very little preference for one over the other. In my

opinion, no additional expenditures over and above the cost of the low dam plan would be justified from the standpoint of navigation under the TVA Unified Plan.

To determine whether a proposed navigation improvement is practically or economically justified, the cost of savings in freight cost due to the project should be greater than the fixed charges on the cost of the project, plus the cost of operating and maintaining it. The construction of Norris, Hiwassee and Fontana Dams and reservoirs on the headwaters of the Tennessee would not benefit navigation under the TVA Unified Plan for improvement of the Tennessee River. When the river has been canalized, the only water required is that necessary for lockage, leakage and evaporation; and the natural flow of the river in the Tennessee is more than ample to supply those needs without reservoirs. Reservoirs at Norris, Hiwassee and Fontana would have a great effect on increasing the firm electric power on the main river projects.

Cross-examination:

I do not recall offhand the duration of the critical period of the flood crest of 1937 at Cairo. I understand that the flood crest for a day or two was slightly in excess of the [fol. 693] regular levee height, above which there had been placed temporary reinforcements, at least at a portion of the levee. I recall that the crest at Cairo stayed at about the same elevation for something over two weeks after the Bird's Point-New Madrid floodway went into operation. I do not know how many days it remained within two feet of the top of the levee. I have not got those figures in mind. I would not estimate, I would look it up. I have made a study of a good many of these extreme floods. I have not studied that one closely. In some respects, perhaps, it was the worst one at Cairo. It was the worst one in the lower valley of the Ohio River.

I was Chief Engineer of the Federal Power Commission for five years. I first started to work for private industry after I left there in 1925. I resigned from the Army in 1928.

"Q. Now, you mentioned a system of low dams, as discussed in House document 328; and as discussed by Colonel Putnam. Are you also familiar with the scheme

of detention basins, dams and detention basins as suggested by Mr. Kurtz in this case?

A. I have not made any particular study of that, no. I saw his testimony, but that is all.

Q. Well, in your opinion, does either of those schemes satisfy the Federal Power Commission's standards for the full development of the resources of the river?

A. Well, I would not say that there was any reason why—

Q. I did not ask you the reason why. I say do they, in your opinion, do either one of those plans satisfy the full plans for development of the resources?

A. I think they would.

Q. Well, take the low dam plan, singly and alone, and explain how that would develop the full resources of the river?

A. It does not prevent anybody that wants to come along and build a high dam for power purposes afterwards doing that, in conjunction with that; and that was a part of the project, that the economic power development could be made in conjunction with it if they were permitted.

Q. On the main river?

A. On the main river.

[fol. 694] Q. And that would in turn flood out the low dams of the system?

A. Yes, take the place of some of those low dams.

Q. So, in fact, Colonel, the low dams themselves, would make no attempt to develop the resources of the river, according to the Federal Power Commission's standards?

A. Of course, you understand the Federal Power Commission would have no jurisdiction whatsoever over a Federal project such as was contemplated by the low dam plan.

Q. And you appreciate also, don't you, that a scheme of detention basins, such as that suggested by Mr. Kurtz would not accomplish the aim of those standards of the Federal Power Commission?

A. It depends on what is the most important use of the water. If it is for local flood protection—

Q. I am talking about the development of all resources, and not a single purpose.

A. (Continuing.) If it is for flood protection, local flood protection, they might very well be the comprehensive development of the project to fit into such a development.

Q. Oh, you mean that they would not,—sort of like the low dam scheme, that they would not obstruct the future development, is that what you mean to say?

A. No, sir, I don't mean that. I mean they might form a part of it.

Q. You do not mean to say that they would accomplish the full development, but that by properly supplementing, these might be considered a part?

A. Well, I don't mean that at all.

Q. Well, you don't testify, do you, Colonel, that either of those schemes taken singly develops comprehensively the resources of the river?

A. They are not complete streams. They don't cover the entire river, nor could they.

Q. And they do not at any particular point develop the full resources, do they?

A. They develop the resources for certain purposes, and they may—I am not familiar with the details of this detention reservoir plan, as I told you. I don't know just to what extent that forms flood protection, but I do know that that sort of a project might be of great value as a flood protection for Chattanooga, and the local Tennessee River. It might be part of a comprehensive development of the river.

[fol. 694a] Q. Accomplishing a single purpose, is that right?

A. I don't know what you mean by that. They might—you are talking about the detention reservoirs?

Q. I am talking about either plan taken singly, they accomplish a single purpose do they not?

A. Yes, they are built, or undoubtedly would be built for a definite purpose.

Q. A single purpose, I said, Colonel?

A. Well, I think they would be for a single purpose.

Q. All right. Colonel, when you referred to the dead storage for power at the TVA dams, did you mean to say that on the series of dams on the main stream of the Tennessee, take Wheeler and Pickwick, for example, that dead storage would not, so-called dead storage,—would it not in fact be the navigation channel itself?

A. Well, of course it would, but it is not necessary to have it there to get navigation. If you build the low dam project you would not have it there.

Q. Well, you mean you could get navigation in another way?

A. Yes, you can get navigation without it. It is not necessary to navigation.

Q. I am sure you are opposed to the high dam scheme of navigation as a matter of principle Colonel?

A. I am not.

Q. You think it is a good scheme of navigation and would afford a feasible navigation channel?

A. The only thing I have got against it is the economics of it."

I have not examined the gates of the dams, such as Wheeler and Pickwick, in detail. I know the kind of gates they are. When I spoke of the dams destroying storage up to the top of the spillway, I took into consideration the fact that a lot of water could be released through those gates. It is those gates that give the control of storage that they are talking about.

I outlined the Jadwin Plan of the levee system for the lower Mississippi flood control in a general way. I didn't go into any details about it. I am familiar with the modifications of the plan that were made in accordance with the recommendation of General Markham, Chief of Engineers. I am not sure that the Morganza Spillway, [fol. 695], which replaces a part of the Atchafalaya Floodway, is shown here in detail, but it is intended to be there. It is marked "Control Works", if you will see the legend on the righthand side, with an arrow pointing to the left, below Smithville Landing. That is the Morganza Spillway.

I testified that the adopted projects, that is, the channel plan of levees, etc., would take care of the maximum predicted flood, and that you might expect a flood flow of about 3,000,000 cubic feet per second. I do not know that the maximum flood for which the adopted project is designed from Cairo to the Arkansas City site is only 2,250,000 cubic feet per second. Of course, the flow from Cairo to Arkansas City is always on a maximum flood going to be less than what it is below. The figure, 3,000,000, I am talking about is from Arkansas City down. My measurement of the 3,000,000 cubic feet per second was about the latitude of Helena.

I am not assuming anything about it. I am stating what the project is. It is stated in the official report and if you want to get at any more detail, I would like to take it out of the report. On Page 24 of House Document 90, 70th Congress, First Session, it states that the predicted stage at Arkansas City of 74 feet is the result of the above stage at Cairo and the Arkansas and White at their maximum predicted stages; below the Red the same flood reduced by a river channel reservoir capacity, and with flow from the Yazoo and Red added gives a project flood which is taken at 3,000,000 second feet. In this document they do not give the second feet at Cairo, at least I didn't put my hand on it right away. It says that the flood used in the design of this plan is that predicted by the Weather Bureau as the maximum possible and by the Mississippi River Commission as the maximum probable. The stages predicted by these two bodies were practically the same; when there was a difference, the higher stage was used. This resulted in a project flood with the stages if confined of 66 feet at Cairo. I don't know that I have got right here the flow in cubic [fol. 696] feet per second at a stage of 66 feet at Cairo. I have an extract of notes that I have made here that states that the maximum flood discharges are estimated as follows: At Cairo, 2,250,000 cubic feet per second; at Arkansas City, 2,850,000 cubic feet per second, and Old River, 3,000,000. Those are the estimates made and used by the Chief of Engineers. Old River is down there near Morganza at the mouth of the Atchafalaya, in Louisiana, just below the Red.

The flow reached at Cairo in 1937 was in the neighborhood of 2,000,000 c. f. s. I don't understand that there was any overtopping of the levee at Cairo. Temporary additions to the levee at that point are a usual precaution whenever your flood comes near the top to prevent wave action and one thing and another from going over it. I don't know what they used. I saw in the paper that they generally used sand bags. I know that there would customarily be only one foot of freeboard on the levees on the Mississippi River when you get to a full channel capacity. But the fuse plug levees are more than that below the top of the main levee.

"Q. Are you familiar with the statement in Committee Document No. 1, 75th Congress, page 6, which contains the report of the Chief of Engineers on Flood Control?

You know there the report says 'A review of all data indicates, however, that due prudence should provide for a flood which, without reservoir control, would reach 2,600,000 cubic feet per second in the Mississippi between Cairo and the Arkansas?' Did you read that?

A. I take it that is a slight revision in the previous report as to what was necessary in that location.

Q. Then, you are not prepared to dissent from it?

A. No sir.

Q. Also, I find paragraph 21 as follows:

'The present levees on the Mississippi are about as high as it is desirable to construct them. An increase in the height accentuates the danger of a crevice, and its consequences, besides presenting the serious hazard of subsidence in the soft ground which they must occasionally cross. Additional safety should be sought rather in the [fol. 697] continuation of the program of improving the flood discharge of the river channel and in reducing peak discharge by the construction of reservoirs.'

Do you agree with that statement of the Chief of Engineers?

A. Well, I have no reason to disagree with it. I do not know what reservoirs he is talking about, but I know that the project as outlined, modified in this plan, contemplates straightening of the channel and the enlarging of its capacities at certain places by setting certain levees back at certain places by getting rid of bends, so that the water will flow through at a more rapid rate, making cut-offs, as they call them. That project is going on. I do not know of any reservoirs that have been adopted as a part of the Mississippi flood project, or recommended.

Q. You do know that the Mississippi River Commission has in recent years recommended reservoirs on the tributaries of the Mississippi, do you not?

A. No sir; I do not. Not for the Mississippi, I am sure they have not recommended to Congress any appropriation for such reservoirs."

They usually refer to the measurement of the discharge at Columbus, just below Cairo. I have not made any computation which shows that the contribution of the Ohio to the Mississippi floods at Cairo has been from 52 to 80 per cent of the great floods of the years 1903, 1912, 1913, 1916,

1922, 1927 and 1929. I do not know it but I would not be surprised if your figures are correct.

Referring to Complainants' Exhibit 409, I made the statement that the run-off had no particular relation to the area, that the run-off on the eastern side was very much heavier than it was on the far western side. At the time of flood, most of our storms are storms coming up off the Gulf, a very heavy rainfall travelling in a general southwest-northeast direction. They do not always stick to a direct route. It is true that the increase in the stage due to the contribution [fol. 697a] of the Ohio persists quite substantially at least to Helena, Arkansas. It certainly makes a substantial contribution to the river all below Cairo. It is the largest contributor, undoubtedly, down to that point. The Ohio flood of 1937 was primarily an Ohio River flood. I do [fol. 698] not think that anybody would have considered the condition very serious below the Arkansas River. From Cairo to the Arkansas River it was a big flood.

Examination by the Court:

If the Missouri River had cut loose full strength simultaneously, it would not have increased the flow in the Mississippi above the maximum they expect. It is always too bad when you get up to a big flood like that to have any more.

Cross-examination continued:

The report of the Chief of Engineers in House Document 306 of the 74th Congress, Paragraph 108, "Nature of Study", states: "It is apparent that reservoirs for the control of floods on the Ohio River must be situated on the tributaries of the Ohio;" and if you are going to try to control it by reservoirs, I do not see where else you could put them. The nearer you get flood storage to the Mississippi, the better it is for the Mississippi control. That is true for any reservoir project for the protection of a location, the nearer it is to that location, the more accurately you can get your control worked out. I do not think it is true that the sites developed or recommended for development on the Tennessee River are closer to Cairo than most of the other sites which have been or could be considered for flood control of the lower Mississippi.

Referring to my map, Complainants' Exhibit 409, the mouth of the Tennessee is not very far from Cairo, about a

day and a half. I thing a large flood control project on the lower Tennessee, say in the location of the Gilbertsville site, would have a greater utility for lower Mississippi flood control than one up in the region of Pittsburgh, assuming equal capacities. That is also true, to a certain [fol. 699] extent, as you move up through the Tennessee and the other streams in selecting your sites. You might possibly find reservoirs on one river like the Arkansas where you could get reservoir capacity enough to control the entire run-off. In that case, you are in a different position to what you are with a reservoir, no matter where it is located, that only has partial capacity.

Paragraph 216 of House Document 306, 74th Congress, First Session, at Page 127 states:

"While it is beyond the scope of this report to draw conclusions, in this connection it is believed that further consideration of reservoirs in the Ohio basin to provide flood control of the lower Mississippi should be confined to the lower Ohio River tributaries, namely, the Tennessee, Cumberland, Wabash and Green Rivers."

I have no objection to consideration of reservoirs anywhere. That is all it says, is consideration of them, and they should be confined to that point, probably because they have exhausted the sites on the other fronts. I do not see that it has anything to do with it, whether they were actually looking for the most efficient locations in point of time. I would look for reservoirs where you can find them. I do not see any objection in looking for them on the Tennessee and Cumberland and it has been done many times, as reported in the 308 reports. They have got full reports on all those reservoir sites. Assuming that the interest there is on the point of controlling floods to the best advantage, due to the time factor, I do not disagree with that statement.

When I need to use the gauge heights at Cairo and the variation in gauge heights with the variations in stream flow, I get the record from the Mississippi River Commission, which shows the flows at various gauge heights. They are not always the same at each gauge height, but within limits that flow is really a gauge height.

The following statement from my paper entitled, "Reservoirs for Mississippi Valley Flood Protection", in Volume [fol. 700] 93 of the transactions of the American Society of Civil Engineers, represents my opinion:

"The effect on gauge heights of this production depends on the increment of discharge corresponding to a change of stage of one foot near the crest of high confined floods. The increment of discharge varies considerably in different floods due principally to changes in the slope of the river caused by variations in relative contributions by the tributaries. Studies on this subject are still in progress, but it is believed that the following discharges can be taken as fairly safe: (a) 65,000 second feet at Cairo; (b) 80,000 second feet at the mouth of the Arkansas River."

"Q. Now, Colonel, assuming that it will be possible to store a minimum of 150,000 c. f. s. on the Tennessee River throughout the peak of the flood on the Mississippi, that is in relation to Cairo, upon that assumption, such a reduction in flow would bring about a reduction on the Cairo stage of upwards of 2 feet, would it not?"

A. Well, you have left out one assumption there that seems to me—

Q. Well, will you take my assumptions first?

A. Yes.

Q. All right.

A. But I cannot answer you on that. It is not complete. I have got to know how long that period is.

Q. I am assuming, Colonel, that at least 150,000 c. f. s. will be retained in the Tennessee throughout the danger period at Cairo.

Mr. R. T. Jackson: I object to the question as there is no basis in the testimony for it. That would require 150,000 second feet for 30 days or more, and there is no such testimony in the record.

Judge Allen: Objection overruled.

Mr. R. T. Jackson: May we have our exception, please.

Q. If that were retained throughout the danger period at Cairo, there would be a reduction on the Cairo gage of upwards of 2 feet, would there not?

A. Well, if you can take out that much water, wherever you take it, I don't—

Q. Just assume it, will you, Colonel?

A. Over the entire flood period?

[fol. 701] Q. Throughout the peak period?

A. It might take off about 2 feet, yes."

There is a concrete levee at Cairo. I do not know what height it is. I do not recall what the top elevation is. I do know that it is designed to have one foot freeboard over the maximum flood. The stretch between Cairo and Arkansas City does not include any substantial contribution from any other river.

Mr. Fly:

“Q. How do you calculate the levee will be adequate for such a flood of 2,600,000 cubic feet per second?”

A. I do not know what the elevation is. I told you I did not know what it is. I think it is higher than 60, though.

Q. But, if it is 60, it is not adequate, is it, Colonel?

A. Well, I think that the maximum flood will go higher than 60 feet, at that point.

Q. Colonel, we had some discussion of the recommendations for reservoirs on the tributaries of the Mississippi, and I think I referred you to one or two documents. Are you familiar with the recommendation of the Mississippi River Commission, House Document 259, 74th Congress, First Session, and particularly the statement there set forth as:

‘Best suited for control of lower Mississippi River floods.’

A. Well, House Document 259 is a comprehensive report on the reservoirs of the Mississippi River basin. I am familiar with that.

Q. And you are familiar with that part on page 18, paragraph 23, plan 1:

‘With the above principles in mind, this office, in collaboration with the district and division offices in the entire Mississippi Valley have selected the system of reservoirs which, from the information now at hand, appear to be best suited for the control of the Lower Mississippi River floods.’

Had you observed that recommendation of the Commission?

A. That is not a recommendation, that is a statement as I see it.

Q. You had observed that statement, however?

A. Yes, sir.

[fol. 701a] Q. As to the system of reservoirs best suited for the control of the lower Mississippi River floods?

A. Yes, but that is not recommended."

I do not recall that Plan 1 sets forth a scheme for 27,100,000 acre-feet of storage on the Ohio and its tributaries, including the Tennessee. The statement in Table 1 on page 40, calling for 27,100,000 acre-feet on the Ohio and its tributaries, including the Tennessee, is the estimated capacity of the reservoirs in that plan. The report states the total of the reservoirs on the Tennessee to be 10,589,000 acre-feet. It lists reservoirs that were included here.

Examination by the Court:

This plan estimates that by using this number of reservoirs, about 20 odd reservoirs on the Tennessee with a storage capacity of 10,589,000 acre-feet would be obtained. The plan is based upon using the complete storage in those reservoirs for the control of floods on the Mississippi.

Cross-examination continued:

I have not added it up, but there is somewhere near 4,600,000 acre-feet of storage that is spotted on or near the sites of Gilbertsville, Pickwick, Wheeler and Chickamauga.

I should think that the sites of Norris Dam and Hiwassee would also be in the same plan. I don't see them on the list, however. Referring to Table 1 on Page 40, there is one mentioned on the Clinch River, that is the Cove Creek project, and there are three on the Hiwassee. I do know that Cove Creek is the former name for the Norris site. I don't know how near the three sites on the Hiwassee, small storage dams, are to the present Hiwassee Dam site. I presume they are in the vicinity of the present Hiwassee Dam site. I know where the Hiwassee is, not very far from Charleston. I know that the Mississippi River Commission found that a comprehensive system of reservoirs in the Mississippi River Valley could be constructed and operated to reduce the maximum probable flood on the Mississippi River so that it could be carried to the Gulf of Mexico within the existing levee system. They did not recommend them, however, as being economically advan-

tageous. The Commission, in the same report, said that an alternative plan known as Plan 2 might be used. It listed a number of reservoirs on the Tennessee River on Page 46, including Cove Creek on the Clinch, with storage capacity of 2,600,000 acre-feet. There are also three dams proposed on the Hiwassee with approximately 500,000 acre-feet. Pickwick Landing is listed with a capacity of 9,990,000 acre-feet, Wheeler with a million acre-feet and Chickamauga with 864,000 acre-feet.

I referred to the dams on the Miami Conservancy system and said that their effect on the Mississippi floods [fol. 703] was uncertain and in some cases I had calculated that it in fact increased the flood heights on the Mississippi and in fewer cases that it had decreased the flood heights. Sometimes they have one effect, sometimes another, sometimes no effect at all. I took the rate of discharge that they are designed to produce. They are automatic and there is only one rate at which they can discharge. The total storage is 841,000 acre-feet. I haven't with me the actual discharge that those reservoirs produce under a maximum flood, but I would assume the maximum rate of discharge. I took the discharge from those reservoirs during the period that the Mississippi was at a serious flood stage at Cairo. That allowed for the time that the water would come down from the Miami River to the Mississippi. The length of time that I allowed from the Miami dams to Cairo is all in the report. I do not have the figures in my mind right now.

The following statement in my article in the Transactions of the American Society for Civil Engineers, Volume 93, Page 727, is about right:

"The effect of the floods on the Mississippi is dependent on the time required for the effect at the mouth of the Miami to be felt at Cairo, Illinois. This has been taken to be nine days."

The following statement from page 725 of the same article represents my opinion and applies to tributary reservoirs:

"In order to determine the effect of reservoirs on Mississippi flood flows, it is necessary to establish some rule for reservoir operations. Practically all large Mississippi floods have occurred during the 90 days from February

15th to May 15th. While there have been a few fair sized floods both before and afterwards, it is believed that this period fairly covers the time within which disastrous floods will occur.

"The time consumed by water released from reservoirs on tributaries in traveling to the Mississippi varies from three days to five weeks, with an average of more than two weeks.

"Large Mississippi floods are produced by widespread heavy rainfall occurring throughout the valley when the river is already running full.

[fol. 704] "The Board has been unable to find any means of predicting a large flood on the Mississippi as much as two weeks in advance of its occurrence. Hence, on the average, the best dependable results from reservoirs will be obtained by filling them as uniformly as the stream flow will permit so as to hold water back from the Mississippi during the 90 days of probable flood, from February 15th, to May 15th.

"In its studies the Board has adopted such a procedure as the rule for reservoir operation. It is possible that for some of the reservoirs a more efficient rule of regulating might be found as the result of experience in their operation, but it is not likely that the increased efficiency would more than offset the probable error due to determining the dependable effect from only five floods, as the Board has been forced to do."

I believe we set up another rule for reservoirs within a certain distance there. That is, if they are in prediction distance, that would conform to the system of discharging ahead of the peak, emptying, and storing at a time corresponding to the peak.

I do not think you can say that ordinarily the peak on the Tennessee either precedes or succeeds the peak on the Ohio. It is a matter of chance as to which way it goes. Sometimes there is no flood on the Tennessee at the time of flood on the Mississippi, and sometimes when the Tennessee is in flood there is no flood on the Mississippi. But the general season is approximately the same, that is, they both are liable to flood during the first five months of the year.

Referring to what would be the same general rainfall and particularly to the fact that the Tennessee is located

near Cairo, I would not think it was ordinarily certain that the peak on the Tennessee will not in fact precede the peak on the Ohio. It does not follow that if you have got a shorter river and a smaller drainage basin the run-off is going to reach there before the run-off from the more distant portions of the Ohio basin, because they may not be [fol. 705] floods caused by the same storm. Assuming the same rain, the same precipitation in the basin of the Tennessee and of the Ohio, whether or not the crest from the Tennessee will reach Cairo sooner than the crest from the Ohio depends on where the rainfall is in the Ohio. If you take a storm like this last one where most of the rain fell right in the valley of the Ohio River, that crest will reach the Mississippi quite promptly. If the flood of the Ohio comes from rains that are up in the upper tributaries, that will be very much later. It generally would be later than the Tennessee if you are taking the run-off from the same storm. When you are talking about a definite storm and assuming that the run-offs in the area drained by the tributaries of the Tennessee and the Ohio, respectively, are the same, it is true that the run-off of the Tennessee will peak at Cairo some time ahead of the peak of the Ohio. I testified that ordinarily the storms move from a southwesterly to a northeasterly direction.

Valley storage, of course, is not still storage. It is water that is moving down the river, and to get the volume, I had to take the figures that were reported in official reports of the War Department. Those were the figures that I got. Valley storage may be a flood and it may not, depending on how high the flow is. In other words, the more valley storage you have, the more flood you have got. The water that may be coursing through the streets of Chattanooga, for example, is valley storage. That is, in a special type of flood. You can pick the peaks at different points and calculate it on the water surveys at some particular time. Valley storage reduces the peak and reduces the maximum flow coming out of the river. It increases the time in which the high water will last. Of course, all this water has to run out. It is just a question of running it out at high speed or slow speed. If it goes slower, it will take longer. Instead of having a great volume of the flood run out on a high peak, you will have a great portion of it run out after the peak, due to this slowing up proc-

[fol. 706] ess. If it happens that that large volume of water slowed up, and running out after the peak on the Tennessee, happens to coincide with the peak at Cairo, the condition might be such as to increase the flood there at Cairo, depending on the question of time.

In answer to the question of whether it would be better to stop the peak of the flood above Chattanooga and keep it under control by means of dams rather than permit the so-called valley storage to flow through Chattanooga, I think that depends upon whether you can do that or not, whether there are reservoir capacities sufficient. The principle of holding the water back, equalizing the flow throughout the year, is one to be desired and to be accomplished, if practicable, from almost every point of view. In other words, controlled without reference to any specific projects, control of flow is desirable. The trouble is that you cannot get it at a reasonable cost, generally. The cost figures on the Miami project averaged about \$18.40 per acre foot of storage capacity. The cost of that flood storage varies with the different reservoirs and some of it is substantially higher than that.

The height to which Pickwick, Gunter'sville and Chickamauga Dams are being built is in the TVA reports. I have them tabulated, but I do not carry them in my head. The depth of the spillway gates at those three dams is also in the 1936 report. Assuming that the depth of the spillway gates is 40 feet, I presume they would be wide open at the time of a great flood. I have not seen any rules of operation that have been adopted by the TVA and I cannot tell you what would be done. My testimony on this point, of course, depends largely upon how the dams will be operated.

My exhibit 411 is just a diagram. It does not profess to show what the flow over the crest would be under these conditions. It is simply as I explained, imposing the conditions without a dam on the conditions with a dam. Supposing you got the dam there and you have a depth of flood of 40 feet, that would discharge a lot of water. I don't [fol. 707] see how it would take out the dead storage. It would remove a great quantity of water, but the dead storage is all below the crest. Opening the gates won't affect that. I have assumed that the gates would be open. Even assuming that if you do discharge that great quantity of

water through the open gates, when the flood starts receding at the particular dam, you can close the gates and you have got to keep the dead storage, but whether the surcharge is kept is a matter of operation of the gates. You can control it within limits. Again it comes down pretty much to the manner in which the dams are operated. Nobody can tell what the answer is going to be until you fix the rule of operation.

Redirect examination:

If the Tennessee River normally peaks ahead of the Ohio, it would be a very logical thing to let the peak water of the Tennessee run out and get rid of it instead of holding it in storage and taking a chance on being able to release it later without increasing the stages of the Ohio, if you could count on it. If you assume that the peak of the Tennessee would normally be ahead of the Ohio, that would be a reasonable method of operation.

Assuming that the Tennessee River would normally peak ahead of the balance of the Ohio system, it might happen that the detention of the flood waters of the Tennessee River so as to retard its peaking through flood storage on the Tennessee River would increase the probability that it would finally be discharged so as to coincide with the peak of the Ohio and increase its stages over what would prevail in a state of nature. It would tend to do that. It would depend upon the operation, of course, on the amount of storage available in the dams.

On cross-examination, I was referred to House Document 259, 74th Congress, First Session, and asked about [fol. 708] certain data shown in a table under the heading "Plan 1" on Page 40. That is merely a study of reservoir sites and their effect upon two different plans on the Mississippi River. The reservoirs referred to from House Document 259 were under the assumptions of that document to be operated solely for flood control. Even when so operated solely for flood control, they were not recommended for construction by the engineers in that report. I would not say that Plan 2 was recommended in that report. It was given preference over Plan 1 and was recommended for consideration at such times as any part of it might be worked out for local benefits. Plan 2 was based on using the reservoirs in question primarily for local benefits and

an estimate was made as to what effect, when so used, they would have on floods on the Mississippi River.

Referring to Complainants' Exhibit 410, the purpose of the Bird's Point-New Madrid Floodway is to reduce flood heights at Cairo. My understanding is that the main levee starting back from Bird's Point to New Madrid is practically finished, but the reduction in height of the old levee along the river has not been accomplished. It is my understanding that that had not been completed at the time of the 1937 flood.

I agree with the following opinion expressed in the report of the Chief of Engineers in House Document 328, 71st Congress, Second Session, Paragraph 19, Page 5, (Complainants' Exhibit 105):

"The report of the District Engineer has been referred to the Mississippi River Commission as required by law. No prospective benefits of importance to the works on the Mississippi River by the system of works contemplated in the Tennessee Basin were found by the Commission."

Detention reservoirs on the tributaries of the Tennessee River and low dams on the Tennessee River could together [fol. 709] accomplish the primary purposes of navigation and flood control on the Tennessee River.

(The witness was excused).

[fol. 710] L. E. WILLSON was called as a witness on behalf of the complainants and, having been first duly sworn, was examined and testified as follows:

Direct examination:

I reside in Sheffield, Alabama, and am engaged in the business of operating dredging and towing equipment under the name of Tennessee Valley Sand & Gravel Company. I have been engaged in that business over 10 years and have operated on the Tennessee River during that time.

The equipment we have been operating on the Tennessee River consists of 3 stern wheel towboats and we own and operate and lease about 30 barges and 1 dredge. One towboat is 18 feet by 70 feet with 75 hp. capacity, one 24 feet by 100 feet with 150 hp. capacity and one 26 feet by 125

feet with 300 hp. capacity. We employ licensed pilots on our towboats. We use wooden barges 20 feet by 90 feet and steel barges 26 feet by 100 feet.

We generally transport sand, gravel, lumber, ties, steel and cement and operate on the Tennessee River from Paducah to Chattanooga. When our barges are loaded to a full 6 feet of draft, the steel barges handle 300 tons. We cannot load them over 300 or 350 tons with zero on the Florence gauge, which means 5 foot depth in the channel. Except for the limitations by the depth of the water at the present time, we could load 6 or 6½ feet.

When we started operations, Wilson Dam, Hales Bar Dam, Riverton Dam and Widows Bar Lock and Dam were already in existence. The headquarters of our Company is at Sheffield, Alabama. Our boats have operated on Wilson Lake above Sheffield and they have recently operated on Wheeler Lake. In my experience in 10 years I have had difficulties only once on the Tennessee River below Wilson [fol. 711] Dam by reason of high waves. We have lost some 5 to 10 days in navigation on Wilson Lake every year on account of high waves. When the waves are high, we go into some hollow and hide until the wind goes down. The waves have to be 2, 3, or 4 feet high before that happens. A downstream wind need not be a very heavy wind to make high waves of that size on Wilson Lake, but upstream it takes more wind. It does not take anything resembling a hurricane to produce waves of that size.

We always check with the lockmaster at Wheeler Lake to see if there are any waves before we go above and if there are many waves, we make arrangements to delay the tow. Wilson Lake, where we have had the danger from waves, is about 15 miles long and from 1 mile to 3 miles wide. Wheeler Lake is something over 80 miles long but I do not know how wide it is at its widest place. Our pilots report that at times they have been unable to see the bank on both sides at the same time. The banks on Wilson Lake are hills and bluffs. Wheeler Lake is wider and has no high bluffs until you get into the vicinity of Gunter'sville, near the upper end of the Lake. This difference in the topography makes the waves rise more quickly and stay more violent in the open lake than in the closed lake.

I am familiar in a way with the dams the TVA is building and has recommended for construction on the main Ten-

nessee River. It is reported in the paper that the lake at Gilbertsville Dam will be about 160 miles long, but I have no idea how wide it will be. Pickwick Pool is about 3 to 3½ times as long as the Wilson Pool.

We know we are going to have to get rid of our stern wheel wood equipment because of the effect of the waves upon the TVA lakes such as those back of Pickwick and Gilbertsville Dams. That is the equipment which has been in use on the Tennessee River and Ohio River for years and is still in use on those rivers. A storm occurred in the [fol.712] vicinity of Wheeler Lake in the latter part of April, 1937, when one of our towboats was going to Decatur to pick up a tow of 4 barges to bring them to Cairo, Illinois, for the barge line and we were delayed 4 days at Wheeler Lake because we could not go through.

We prefer the low-lift navigation locks to the high navigation locks, such as have been placed in recent TVA dams, as to feasibility and convenience of towing barges, because it takes less time to lock through and less difficulty in getting the boat in the lock. We also operate on the Ohio running into 3 ports there, Joppa, Brookport and Cairo.

Cross-examination:

Our Company is the Tennessee Valley Sand & Gravel Company. It has no connection with the Birmingham Slag Company. Our Company in April of 1934 bid on the Wheeler aggregate job with the TVA, and when the contract was not awarded to our Company, we filed a protest with the NRA and there was quite an argument on the ground that the successful bidder had not complied with the code. We did not get the contract which involved 1,400,000 tons of aggregate. I do not know the exact language of the decision. The Birmingham Slag Company made a protest to the TVA as to the award of the contract for the Pickwick aggregate job to the Cumberland River Sand & Gravel Company, and I went to Knoxville with representatives of the Birmingham Slag Company to protest that award, but I represented myself as I was going to sublet some equipment for that job. I had nothing to do with any lawsuit filed over that contract.

I had a disagreement with the contractor for whom I was working about the payment of demurrage on certain

shipments of cement at Sheffield during the flood in April, 1936, which involved certain discussions and correspondence with the TVA.

I never navigated the Muscle Shoals section of the Tennessee River before Wilson Dam was constructed and I believe it could not have been navigated. I have navigated the section of the river covered by the Wheeler Pool before Wheeler Dam was constructed. There were difficulties involved in navigating that section of the river in its natural condition in low water seasons when the minimum depth was about 3 feet. The channel was not narrow and winding from the Wheeler Dam Site to Decatur and Gunter'sville but it was along Lock A and Lock B. We had to go through 4 low-lift locks. It would take about as long to go through those locks as it would to go through 1 high lock. It takes about 35 minutes to go through the first lift at Wilson and 45 minutes to go through the second, and it would take about 20 or 30 minutes to go through a low-lift lock. If you multiply that by 32, it will take more time than it will to go through 7 high-lift locks.

We could navigate the stretch of the river covered by the Pickwick Pool before Pickwick Dam was constructed. In that stretch of the river there was only one spot about 100 yards long where there was any difficulty. The minimum gauge in low water was $4\frac{1}{2}$ feet. Zero on the Florence gauge meant 5 feet in the chutes.

If you have 9 foot barges, a channel providing a minimum depth of 9 feet is a better channel for navigation than one with a minimum depth of $4\frac{1}{2}$ feet. In ordinary navigation on the Tennessee River with a minimum depth of about 5 feet of water, we could use barges to $6\frac{1}{2}$ feet. That would not be helped any by a $4\frac{1}{2}$ foot draft.

My pilots reported at one point on Wheeler Lake they could not see both banks at the same time. It was in the daytime. There was some fog.

At one time we were delayed at Wheeler Lock for 4 days [fol. 714] is going to Decatur for our tow because the lock was not operating. I am not a confidant of TVA to such an extent that I know whether or not the lock has been changed or altered. I do not know that the Army Engineers are fixing the lock. The four day delay was due to the fact that the waves had caused the lock operating machinery to get out of order.

Redirect examination:

On this occasion we were informed we could not get through the locks at Wheeler Dam. I sent my superintendent up there to find out why, because we were unable to get thorough information by telephone. He reported that the waves had washed over the bulkheads, into the machinery, that there were no spare motors, and that they had to dry out the motors that were there. The only way they could dry the motors out was with low voltage current and that would take several days.

We try to operate our boats all the time, when there is fog and rain or when there is sunshine.

I do not think the trip from Paducah to Chattanooga would be delayed to vary more than 15 hours at the outside in going through low-lift dams, if they had been installed on the Tennessee River; and a lot of other delays, such as fogs, winds, tie-ups and one thing and another would offset that. The lock delay would be of no practical significance in navigating the river.

Recross-examination:

I do not know whether or not it is a fact that the ordinary water level of the pool was only 15 inches from the operating machinery in the lock as originally built and at the time of this so-called high wave.

(The witness was excused.)

[fol. 715] J. F. BURLISON was called as a witness on behalf of the complainants, and having been first duly sworn was examined and testified as follows:

Direct examination:

I live in Haleyville, Alabama, and am the Mayor of Haleyville. I have been Mayor a little more than a year. Last summer I paid a visit to the offices of the TVA at Wilson Dam and was accompanied on that visit by J. T. Bachelor and W. R. Rutledge, two of the city councilmen, J. A. Posey, City Attorney and C. L. Webb, City Clerk. We saw Mr. Beauchamp at the TVA offices. We had some folks in our town who became interested in the TVA power and

lights, so we made this trip to see if we could get it and on what terms. While we were there, we discussed with Mr. Beauchamp calling an election for municipal ownership of an electric distribution system in Haleyville.

"Q. Did he make any suggestion with reference to the conduct of that election?

Mr. Fly: I object to the advice as to elections. I think, your Honor, that is going far afield.

Judge Allen: Objection sustained.

Mr. Bouldin: And we except, your Honor, and offer to show by this witness that Mr. Beauchamp advised the city officials not to hold their election until they circulated among the residential consumers of electric energy in the city of Haleyville a contingent power contract, and stated that his reason for advising that circulation was that if they would the people who would sign those contracts would vote for municipal operation, and the election would carry in favor of such election."

We had a discussion with Mr. Beauchamp as to how the system might be financed.

"Q. I will ask you what suggestions he made in that regard.

Mr. Fly: I object to the advice on the financing, your Honor. I think we can see what is coming here.

[fol. 716] Judge Allen: The objection is sustained.

Mr. Bouldin: We except, your Honor, and offer to show that Mr. Beauchamp suggested that the city go to Mr. Hogan, Mr. Frank Hogan of the Universal Electric Construction Company of Sheffield, Alabama, who would buy the bonds, and suggested as a reason why they should see Mr. Hogan was that he was the only person who would buy the bonds, as the Alabama Power Company had the rest of them scared off."

Mr. Beauchamp stated to us that the TVA would cooperate in any way with the engineering establishment of our system.

"Q. What did he say the TVA would do in that regard?

Mr. Fly: I object to this.

Judge Allen: The objection is sustained.

Mr. Bouldin: And we except, your Honor, and offer to show that Mr. Beauchamp said that a TVA engineer and Mr. Hogan would come to Haleyville together, and make a survey of the city system to determine what the cost of such a system would be, and whether Mr. Hogan would purchase the bonds, but before the TVA would do such a thing that the city must write to the TVA and request such a system, and suggested to Mr. Burleson that he write to Mr. Martin Glaeser of the Tennessee Valley Authority, the Chief Power Planning Engineer of the Tennessee Valley Authority, and request such assistance."

I wrote to Mr. Martin G. Glaeser of the TVA requesting his assistance. I do not have a copy of that letter. I searched for it, but was not able to find it, and I don't know just what happened to it. The substance of what I stated to him was that the people of Haleyville were interested in TVA power and that we would appreciate his sending an engineer or somebody to help us figure the feasibility of putting in such a distribution system.

The letter (offered and received in evidence as Complainants' Exhibit 412) is the reply received from Mr. Glaeser in response to my letter. In our meeting with Mr. Beauchamp there was a discussion of the purchase by the City of the Alabama Power Company distribution system in Haleyville.

[fol. 717] "Q. What suggestion did he make, what did he suggest that the city do in that regard?

Mr. Fly: I don't think that is material, your Honor.

Judge Allen: Objection sustained. You may have your exception.

Mr. Bouldin: We except, your Honor, and offer to show that Mr. Beauchamp advised the city to write to the Alabama Power Company and offer to buy their system, that the Alabama Power Company would not sell it, but he thought the city ought to do it, as the Power Company would put up a fight if the city began municipal ownership."

Cross-examination:

The City of Haleyville does not have a power contract with the TVA.

(The witness was excused.)

JOHN A. DUNLAP was called as a witness on behalf of complainants and, having been first duly sworn, was examined and testified as follows:

Direct examination:

I reside in and am Mayor of Cullman, Alabama, and also am the Cashier of The Leeth National Bank in Cullman. I have been Mayor of Cullman since October, 1932. The City of Cullman owns and operates its own electric distribution system and has its own generating capacity for that system, which has been operated for 25 or 30 years.

"Judge Allen: Is this witness going to testify to the same general effect?"

Mr. Bouldin: This witness will testify that without solicitation on the part of the city of Cullman that he received a letter from Mr. F. F. Beauchamp of the Tennessee Valley Authority stating that Mr. Beauchamp had been to Cullman and had made a survey of the needs of the city of Cullman in the way of power supply, and Mr. Beauchamp's letter, in closing—

Judge Allen: Will you let us see the letter?"

[fol. 718] The letter dated February 12, 1935, with documents attached (offered in evidence as Complainants' Exhibit 413) is from Mr. Beauchamp of the TVA to the City of Cullman. The City of Cullman had never invited Mr. Beauchamp or the TVA to make any survey of Cullman's properties to ascertain their generating capacity and the need for electrical capacity.

"Mr. Fly: We object to that as irrelevant. The City of Cullman was not a customer of the Alabama Power Company or any of the complainants.

Judge Allen: Exhibit No. 413 is rejected, and you may have your exception."

The letter dated April 13, 1936 (offered in evidence as Complainants' Exhibit 414) came to me as Mayor of the City of Cullman from Mr. Beauchamp, TVA Division Engineer at Wilson Dam. (Thereupon counsel for defendants stated that they had no question about this being the correspondence that went from the TVA to the City of Cullman)

"Mr. Bouldin: We offer complainants' exhibit 414 in evidence.

Judge Allen: Exhibit 414——

Mr. Fitts: Objection.

Judge Allen (continuing): —is rejected. You may have your exception."

The copy of the letter, dated May 27, 1936 (offered in evidence as Complainants' Exhibit 415) was sent from me as Mayor of the City of Cullman to Mr. Beauchamp.

"Mr. Fitts: We object to that.

Judge Allen: The objection is sustained to Exhibit 415. You may have your exception."

[fol. 719] The copy of the letter signed by F. F. Beauchamp, dated July 9, 1936, (offered in evidence as Complainants' Exhibit 416), addressed to me as Mayor of Cullman, was received by me through the mails.

"Mr. Fitts: We object to that exhibit on the same ground.

Judge Allen: Objection sustained, the exhibit is excluded. You may have your exception."

The copy of the letter dated August 4, 1936, (offered in evidence as Complainants' Exhibit 417), was sent by me to Mr. Beauchamp.

"Mr. Fitts: We object to that letter.

Judge Allen: The same ruling, the objection sustained and the letter excluded. You may have your exception."

The City of Cullman serves St. Bernard College, which is one of the City's largest commercial customers.

"Q. Has anybody ever threatened, or competed with the city for that service?

Mr. Fitts: We object to that, may it please the Court. The city is not suing, and I understand it cannot hurt the complainants any.

Judge Allen: Objection sustained. It has nothing to do with the complainants.

Mr. Bouldin: We except and offer to show that the Cullman County Membership Corporation did start to build a line to serve that customer, and that Mr. Dunlap protested to Mr. Beauchamp of the Tennessee Valley Authority that

I have also accepted the statement of the witness Kelly that no part of the investment in the TVA Unified Plan has any practical value for flood control on the Mississippi River. I have determined the investment which should properly be charged to power development as the difference [fol. 792] between total investment, excluding the expenditures made for Wilson Dam, prior to May 16th, 1933, and the value of navigation and flood control facilities as testified by the foregoing witnesses.

I determined the operating costs for the generating facilities in the Unified Plan. In doing so I accepted and used as a working basis for my estimate, figures of TVA presented during hearings in First Deficiency Appropriation Bill for 1936.

I next determined the investment in the transmission system which would be required to transmit to market the power to be produced by the facilities contemplated by the Unified Plan.

I predicated my estimate of this investment upon analysis of the transmission system of the Alabama Power Company, including its large customer, Birmingham Electric Company, because of the characteristics which it possesses in common with the one which would be required in the TVA Unified Plan in order to determine at unit cost of transmission system per unit of load.

In determining the cost of this transmission system I included only the cost of the system needed to deliver TVA power to TVA customers, and have included nothing for the facilities which would necessarily be owned by TVA wholesale contractors, and I have included no facilities for the delivery of dump power.

I made a determination of the cost of operation of the transmission system which would be required to carry out the TVA Unified Plan. By analysis of the operating costs of the transmission system of Alabama Power Company, I determined unit cost of operation per unit of energy transmitted, and applied those units of cost to the operation of the system which would be required to carry out the TVA Unified Plan.

In making this application I made what I deemed proper adjustment for higher load factors which I estimated would obtain on the TVA system.

In determining this TVA cost I have given effect to annual charges for interest during construction of generating

plants and taxes lost through displacement of existing utility systems, and to commercial and metering expense and general and administrative expenses.

As a result of this analysis I have estimated that the total increment yearly cost for the generation and transmission of power under TVA Unified Plan will be \$32,557,000 per year, excluding all costs associated with the investment in and operation of the facilities installed at Wilson Dam at the time it was turned over to TVA.

[fol. 793] In addition to these total increment yearly costs I have not given the full effect to the items of interest and depreciation expense and taxes (excluding 3 per cent Federal Sales Tax) which would have been paid by a private utility company operating the same system, as would be operated by TVA. These items to which I have not given effect total approximately \$10,510,000.

Thus, I have estimated that the total out-of-pocket expense, plus items of expense which would be incurred by a private utility if it operated the TVA system, would be approximately \$43,000,000.

I have also made a detailed study of present and potential markets within the area surrounding the TVA developments, and have estimated that the total yearly revenue which TVA would derive from the sale of its power would be \$23,551,000 over and above the revenue of \$2,253,000 which would have been available from the Wilson Dam development as it existed at the time it was turned over to TVA.

On the basis of extensive analyses to which I have testified, in my opinion the power operations of the TVA as contemplated in the Unified Plan, ultimate stage, would result in an annual deficit amounting to at least \$9,000,000 per year, and taking into consideration the additional cost which would be sustained by a private utility if it were operating the proposed TVA system, the annual deficit from TVA power operations will amount to approximately \$19,516,000 per year. This is upon the assumption of full normal loading of the TVA Unified system within the limits of practical utility operations.

I have had prepared under my direction and supervision a tabulation entitled 'Summary of Annual Deficit from TVA operations Unified Plan—Ultimate Development Excluding Initial Stage of Wilson Dam,' which has been marked for

identification Complainants' Exhibit 506. This exhibit correctly states the results of my study and analysis, and reflects my best judgment on the subject which it purports to treat.

The costs and deficits set forth in this exhibit do not include any costs or deficits associated with the operations of wholesale contractors when they purchase TVA power for resale, and they do not include any allowance for the Federal 3 per cent Excise Tax on residential and commercial electric sales which private utilities are now obligated to pay. My estimates of the costs and deficits set forth in this exhibit do not give effect to any government loans and grants to wholesale contractors for distribution of TVA power.

[fol. 794] "Q. Mr. Moreland, please state whether, in your opinion the completion of the TVA Unified Plan and the marketing of the amount of power which you have estimated in your previous testimony could be generated for sale, would inflict any damages upon the plaintiffs.

Mr. Fly: I object to any such general either factual or legal conclusion as to whether or not it would inflict damage. I don't think the witness is qualified.

Judge Allen: He may answer. I remind counsel that the Court has assumed the existence of substantial damage growing out of the competition here shown to exist between the Tennessee Valley Authority and these complainants.

A. Such sale would cause substantial damages to the utilities within the 250 mile zone."

I have made a study of whether under those circumstances any damages would result to the complainants by reason of duplication and loss of use of facilities; and I have also made a study as to whether there would be damages to the complainants upon the hypothesis of the completion of the TVA Unified Plan and the marketing of the power which I estimate might be generated under that Plan at TVA rates through loss from reduced rates.

If the TVA Unified Plan is carried out, there will be two types of displacement of the facilities of the complainants. There will be permanent displacement of certain types of facilities, including distribution facilities in local area, if the TVA takes over the service of supply, and permanent displacement of the transmission lines and some substa-

tions supplying those service areas taken over by TVA. These displacements will in some instances be complete and permanent and the utility can remove the equipment and salvage as much of the cost as possible. There will also be a second class of displacement where facilities will be rendered either temporarily idle or will be forced to operate at capacities far below the capacities for which they were intended. This type of displacement may be temporary, because future growth of the utility system's load [fol. 795] may absorb some of the capacity thus rendered idle by loss of load to TVA. As TVA expands, the period during which the temporary idleness may occur may be increased. In making our estimates, we have taken a period of idleness that we think reasonable for TVA's program, and if TVA markets more and more power in any particular community, the idleness may become so long that it will be permanent.

Our general method of computing the damages due to loss of facilities has been to determine the amount of business in millions of kilowatt hours that the utilities will lose to TVA, and then to determine the loss to the utilities per million kilowatt hours of sales lost to TVA, and the total loss is the product of these two figures.

As I have suggested, permanent loss of facilities or of the usefulness of the facilities is the cost of the facilities which are lost less whatever can be secured from the salvage of the equipment. Temporary loss is the loss due to the carrying charges and such maintenance and operating expenses as may be associated during the period of idleness. In making this analysis, we have used the unit of millions of kilowatt hours lost rather than the unit which is frequently used in the electrical business of the kilowatts of capacity, simply because it is more convenient and accurate. We do not estimate that all of the TVA sales will go to present customers of the utility companies. We estimate that a very considerable part of the TVA sales will go to other customers, and our estimates of the loss to the utility companies deal only with the losses associated with the part of the TVA's production which will go to the replacement of customers served by the utilities.

[fol. 796] In determining the millions of kilowatt hours of sales taken from the utilities by TVA, we have first had to estimate the amount of power available for sale by TVA. From the total amount available for sale, we have deducted

the sales to present TVA special customers and their sales to present ceded areas. We have also deducted the transmission losses from the point where the power is developed at the generating stations to the point of delivery to the customers. The total salable output of TVA will be 7,670,000,000 kilowatt hours. This is the available output at the generating stations. The amount actually sold to customers will be less than this by the amount lost in transmission.

The table (offered and received in evidence as Complainants' Exhibit 507) shows the total power available at the generating plants of TVA under the Unified Plan in the ultimate development in a typical water year and the amount of power in kilowatt hours and the corresponding kilowatts at 100 per cent load factor with the various classifications of power, firm power, two classes of secondary power and dump power which we estimate will be used, and the additional energy available but not marketable. The first figure shown under the heading "Primary Power Available" comes from the hearings for the first Deficiency Appropriation Bill, and was verified by Mr. Kurtz in his testimony, and the kilowatts at 100 per cent load factor corresponding to those kilowatt hours also comes from the same source. In order to describe the way in which the next figure was determined, I refer to the item of 917,000,000 kilowatt hours in the first column under the main side heading "Annual Secondary Power Guaranteed 75% of the Time in Every Year." That figure is our estimate of the amount of power of that class which will be sold to certain large industries for electro-chemical and electro-thermal use when the TVA has reached its ultimate development and has marketed its firm power and high class secondary power output. This estimate is based on a consideration of the amount of power of this class which TVA has already committed itself to supply under existing contracts which it has with a number of large industrial concerns which are entitled to purchase certain proportions of this type of secondary power which is guaranteed for 75 per cent of the time each year. The total permissible takings under present conditions for the customers, if they take all of this output of power that they might take, is 611,000,000 kilowatt hours at the generating stations, and something less than that at the customer's premises due to transmission losses. We have estimated that TVA will probably make some other contracts of this same type. This estimate is based upon

our opinion that in order to dispose of the very large amount of power which TVA will have for sale, it will be necessary for TVA to procure as customers additional large industrial buyers of the type which could use this kind of secondary power, and in order to secure these customers, it will have to offer some secondary power of this class.

We have estimated that this amount is likely to be such that the total actual consumption of this type of secondary power will be 50 per cent greater than the permissible consumption under contracts already in force. On this basis it would require at the generating stations 917,000,000 kilowatt hours of this type of secondary power to meet the customers' requirements, and the corresponding kilowatts of capacity would be 104,700. Mr. Kurtz in his testimony stated that in order to guarantee the availability of 100,000 kilowatts of this type of power in the occasional extremely dry year, it would be necessary to reduce the firm power output by 35,000 kilowatts, because it is necessary in those years to hold water in the reservoirs in order to make this type of secondary power available nine months of the year. The dry period in those extreme years is of such long duration that the period of shortage, unless water were held in the reservoirs for that purpose, would be longer than the permissible shutdown for 25 per cent of the time. We have estimated that if, as Mr. Kurtz says, it will take 35,000 kilowatts of firm power to guarantee 100,000 kilowatts of secondary power during all years, then by proportion it would take 36,700 kilowatts of firm power to guarantee the required 104,700 kilowatts. Firm kilowatt hours corresponding to the 36,700 kilowatts of firm capacity that will be sacrificed is 322,000,000 kilowatt hours and that is the figure which is shown as the second item on the table from the total available of 5,780,000,000 kilowatt hours, which leaves 5,458,000,000 kilowatt hours as the net firm power available. As a matter of practical operation, it is not possible to sell right up to the limits of the available capacity and, in my opinion, 95 per cent is as near the top as it is practical to go. We have, therefore, deducted 5 per cent of the net firm power available, which is 273,000,000 kilowatt hours, and so the balance after that deduction is 5,185,000,000 kilowatt hours, which is the amount of power [fol. 799] salable at the generating stations as firm power.

The next item on the table is 917,000,000 hours of secondary power guaranteed 75 per cent of the time, to which I have referred.

The next item under the side heading "Other Secondary Power Guaranteed 75% of the Time" is shown as 790,000,000 kilowatt hours. This is the amount of this type of power now required under present contracts. We have not estimated any increase in the sale of this type of secondary power, although there may possibly be some. We have estimated it at the amount required under the present contracts, including requirements for TVA fertilizer works, which may not strictly be under a contract, because in our opinion if the amount of this type of power which is sold is materially increased, it would also require a reduction in the amount of firm power available.

The sum of all the figures I have referred to up to this point is 6,892,000,000 kilowatt hours of firm and secondary power available for sale at the generating stations. 778,000,000 kilowatt hours of dump power can also be sold. Dump power may be sold without any guarantees at all and is sometimes known as run-of-river secondary power. Our reason for estimating that only 778,000,000 kilowatt hours will be sold out of a total available supply of this type of power of over 3,000,000,000 kilowatt hours is that the market for this type of power is limited. Such power can be used by organizations which have their own power facilities, to replace steam generation. Also, in view of the very low rate at which this type of power must be sold, if it is sold at all, it is ordinarily not economical to build transmission lines for its sale and delivery alone, and so it must be sold over existing lines through connections to [fol. 800] existing customers or to customers which can be easily reached from lines established for other purposes. The total is 10,000,000,000 kilowatt hours as testified by Mr. Kurtz, but we estimate that only 7,670,000,000 kilowatt hours, including dump sales, is salable.

Examination by the Court:

There was no figure on Complainants' Exhibit 507 which was not estimated by somebody. The first figure of 5,780,000,000 kilowatt hours is estimated by the TVA, being taken from the report in the hearings on the First Deficiency Appropriations Bill of 1936. The final total figure of 10,-

000,000,000 kilowatt hours was estimated by Mr. Kurtz, and we have made the intervening estimates based partly on Mr. Kurtz' figures and partly on the contracts already in force. The figures for the firm and secondary power are calculations made by hydraulic engineers upon the basis of stream flow records, and known or assumed heads. (The Court then asked counsel for complainants to insert the word "Estimated" in the legend on Complainants' Exhibits 507, 508 and 509).

Direct examination continued:

The table (offered and received in evidence as Complainants' Exhibit 508) shows our estimate of the way this 7,670,000,000 kilowatt hours of marketable output will be used. The first column shows the estimated station output required to provide the various requirements. The first three items at the top of the table are our estimates of the requirements in 1943 of customers now being served by TVA, and of TVA government operations, which amounts to 2,805,000,000 kilowatt hours. I have already referred to [fol. 801] the next to the last item in this column, the sales of dump power of 778,000,000 kilowatt hours. Deducting these two figures from the total amount of marketable output leaves 4,087,000,000 kilowatt hours of power available for sale in the competitive market. Not all of TVA's available power will go into the competitive market and not even all of this figure will go to taking away customers that the utilities now have.

The division of that 4,087,000,000 kilowatt hours between various classes of contractors and customers is estimated on the division of power sales between various classes of customers on a typical system in this general vicinity. We looked at several systems and decided that the Alabama Power Company, for which complete information was available, was reasonably representative of the territory throughout which TVA may be expected to operate. The only use we have made of it is to determine how much of that 4,087,000,000 kilowatt hours may be expected to be sold to wholesale contractors for resale, and how much may be expected to go to industry. We made a further estimate that approximately one-third of the power used for industrial purposes would go to mixed power customers utilizing some secondary power as well as firm power, and oper-

ating at a high load factor, and that the balance of approximately two-thirds would go to normal industrial uses. The next column shows the station output in kilowatt hours required to produce these sales. The second, third and fourth columns show the kilowatt hours delivered to TVA's customers, and in those columns we have divided between power sold to customers taking only firm power and power sold to mixed power customers taking both firm and secondary power. The last two columns at the right of the table do not relate directly to TVA's operations, and are not really used in our figures at all, but are presented to complete the accounting for the power generated. The customers who buy power wholesale from TVA, such as municipalities, will have certain distribution losses on their own systems and the amount they buy will be more than the amount they actually sell to the ultimate consumers, and that is reflected in those two last columns, the final column showing the actual total kilowatt hours reaching the customers' premises, including indirect sales as well as direct sales by TVA.

The table (offered and received in evidence as Complainants' Exhibit 509) shows the detail of the estimate which is summarized on Complainants' Exhibit 508 and lists the present TVA special customers to whom I have referred.

The table (offered and received in evidence as Complainants' Exhibit 510) present a summary of the estimates of the sales in the same zones of 100, 150 and 250 mile radii. These are the estimated sales if served by existing utility systems under their present sales policy. The make-up of the table needs no detailed explanation as it is exactly similar in form to the table, Complainants' Exhibit 508, previously described. The load predictions for the complainant companies were in general made by the companies themselves and we made the estimates for the companies which are not complainants. At the bottom of the table there is shown the arithmetical average for the years 1937 to 1943 of the two sets of figures above. The purpose of this will appear later.

[fol. 803] The table (offered and received in evidence as Complainants' Exhibit 511) is an estimate of load displacements to be expected by complainant companies from TVA operations. I changed the legend in line with the Court's

suggestion to read "Estimates of complainants' load displaced."

Examination by the Court:

(On Complainants' Exhibit 511 there appears as a sub-heading:

"Estimated annual sales to ultimate consumers if TVA rates and TVA sales policies were applied throughout the territory, after exclusions noted in the title for the year, 1943, millions of kilowatt hours.").

The table previously presented shows an estimate of the amount of sales in this territory that would take place if the utilities went ahead as they had been, making occasional rate reductions when they felt they could be made or when ordered to make them by some regulatory body. Then I recognized that if TVA had this territory, without considering the competitive situation with private utilities, at its own rates, which, of course we all know are lower than the normal utility rates, and if the type of sales efforts were pursued which they have introduced in territories which TVA serves directly or through wholesale customers, then the sales would be somewhat greater than they would be under the continued utility policy. That difference is reflected between the difference of the figures shown in this table and the table shown in Complainants' Exhibit 510. The reason we are taking that into account is that if TVA induces more business in that area than there would have [fol. 804] been if TVA had not been there, then TVA should be charged with taking from the utilities only the proportion of that larger market which they took, and not the proportion of the smaller present market. The heading "Estimated annual sales to ultimate consumers" refers to total sales in the whole 100 mile zone or 150 mile zone, or whatever the case might be, by all utilities operating in that particular area, excluding the TVA sales, as shown in the title.

Direct examination continued:

In Complainants' Exhibit 511, by "if TVA influence were uniformly distributed", I mean uniformly distributed over the area where TVA is selling power, and, by "sales

policies", I was assuming that TVA or TVA wholesale contractors continued their aggressive sales policies of influencing customers in the utilization of electric facilities which have been exhibited by present TVA wholesale customers. I think we all recognize that TVA and TVA's wholesale contractors have shown perhaps even more interest and enthusiasm in arousing the customers to the possibilities of utilizing electricity in their homes. I refer to a program of promotion by the distributors of TVA power.

The first set of figures across the table, Complainants' Exhibit 511, shows for each of the three zones the estimated sales in 1943 to ultimate consumers, excluding TVA government operations and present TVA special customers and wholesale contractors now served and present direct service areas now served by TVA, divided between areas which now have electric service from the public utility companies and areas which have no electric service from the [fol. 805] public utility companies. It shows, for example, that the total estimated sales in the 100 mile zone, excluding TVA operations and other sales to which I have just referred, in the year 1943, would be 6,265,000,000 kilowatt hours. The next line of figures below, under the side heading "TVA Power available under the Unified Plan for sale to ultimate consumers", after the exclusions of TVA government operations in the 100 mile zone, shows 3,272,000,000 kilowatt hours, and that figure comes directly from Complainants' Exhibit 508. The final Column on Complainants' Exhibit 508 is the sales to ultimate consumers of TVA power of this certain class which would go into the competitive market and that is shown as the item of 3,272,000,000 kilowatt hours of power available from TVA. The next line of figures shows the percentage which that available power from TVA bears to the total available market and shows that of the total available market that there would be in 1943, if the market had the benefit of all of TVA's rate inducements and progressive policies as to customer expansion in the 100 mile zone, would be 52.3 per cent. That is, the TVA power available will supply 52.3 per cent of all the power that could be sold in that zone and it relates to all of the utility business in that zone. But we are dealing only with the business lost to the complainant companies. I am not interested in the losses to non-complainant companies.

The lower part of the table, Complainants' Exhibit 511, shows first the prospective annual sales of complainant companies, if uninfluenced by TVA as shown on Complainants' Exhibit 510. At the bottom of Complainants' Exhibit 510 [fol. 806] in the first set of columns relating to the 100 mile zone, it is shown that the direct sales by complainant companies and the average between 1937 and 1943 is 2,976,000,000 kilowatt hours, and that is the figure that is shown on Complainants' Exhibit 511 under the heading "Direct Sales", and similarly the indirect sales and the total sales. We then apply to those sales the percentage derived just above, which for the 100 mile zone is 52.3 per cent, and if the TVA is to get 52.3 per cent of all markets in that zone, it must get 52.3 per cent of the utilities' market, and the number of kilowatt hours lost therefore is 52.3 per cent of what the utilities would have had, which amounts to 1,571,000,000 kilowatt hours. Now, by that method of computation, TVA is given credit for any increase in customer consumption that results from TVA policies, because the 52.3 per cent which we are applying was determined from the base figure of the total kilowatt hours that would be sold if TVA policies applied throughout the whole territory. Therefore, in estimating the loss to the complainant companies we are estimating only the loss of the business they would have had under their own rate policies, and not saying that they would also lose the greater business they might have had if they had had TVA rates.

The reason I use the average between 1937 and 1943, rather than the 1943 figures themselves is this, that presumably the taking over of business by TVA, whether in the 100 mile zone or the 200 mile zone or any other, will be a progressive taking. If business is taken over uniformly from 1937 to 1943, for example, the average condition is represented by the average between 1937 and 1943. The [fol. 807] customers that they take over in 1943 will experience the normal customers' growth during that period and the ones that they take now will not have experienced any growth. So if we take the average between the 1937 and 1943 figure, it represents the average condition not only as to the customer size but as to the number of customers. In my opinion, it is the fair way to estimate the actual losses to the utility companies in kilowatt hours and that is the method which we have followed.

The chart (offered in evidence as Complainants' Exhibit 512) was prepared under my direction and accurately portrays what it purports to show. It is a summary of our estimate of the total loss to the utilities per million kilowatt hours of sales displaced. The two essential figures on the sheet are the \$29,590,000. shown under the heading "Grand Total" and the second figure of \$14,320,000., which is the total excluding the distribution system losses. The reason for having two figures is because we must compute two kinds of losses. This is the estimate of damages in money from idleness of equipment. It is the figure we are now going to apply to the estimated kilowatt hours that we expect the utilities to lose in order to arrive at the total money damages.

"Q. Have you completed your description of exhibit 512?

A. Well, I have not really said very much about it yet. I am not going to go into it, I think, in any great detail. I would like to say a little about the general principle, on which the estimates were made.

In determining the money value of losses occasioned—

Judge Allen: The Court does not care to hear you, Mr. Moreland, upon that question. It does not care to hear any estimates of money damage. You may have your exception. [fol. 808] Mr. R. T. Jackson: Note an exception, please. I now produce a further exhibit which has been submitted by the witness and ask to have it marked Complainants' Exhibit No. 513. I will at this time offer exhibit 512, as to which the Court has just made a ruling.

Judge Allen: Yes, the Court excludes exhibit No. 512.

Mr. R. T. Jackson: And we may have our exception.

Judge Allen: Do you want to offer this right away? I wanted to ask the Authority if they concede the qualifications of this exhibit.

Mr. Fly: I would not concede that any witness is qualified to render these opinions, your Honor, with all deference to Professor Moreland. I think he is as near qualified as anybody. I think it is so speculative and remote as to be entirely valueless. I think moreover the subject matter of the thing is quite irrelevant and immaterial to this case. I object to it on that ground.

Mr. R. T. Jackson: May I raise another point which is suggested to me because of the Court's present inquiry?

The Court just stopped Professor Moreland from describing the methods by which he arrived at the opinions disclosed on exhibit No. 512 just excluded. Now, I don't want to burden the Court with an explanation of that. The only thing I do want the record to do, and to be clear upon is that the exclusion is not based upon the failure of Professor Moreland to explain the processes by which he arrived at the figures and opinions and estimates based on exhibit No. 512, and that counsel for defendants join in stating that they do not urge any objection upon that ground, and will not hereafter assert that it was incompetent because there had not been any proper foundation laid through an explanation by the witness.

Judge Allen: The Court did not exclude this testimony because of any such lack of proof. The Court excluded the testimony because it did not care and does not care to hear testimony of money damage in this case.

Mr. R. T. Jackson: That was what I understood the Court to be doing.

Judge Allen: That was the sole ground.

Mr. R. T. Jackson: It did not matter how good Professor Moreland's reasons might be, the result was such—
[fol. 809] Judge Allen: Yes.

Mr. R. T. Jackson:—that the Court was excluding it upon that ground.

Judge Allen: Yes.

Mr. R. T. Jackson: And we therefore lost nothing by failure to amplify the foundation for the exhibit.

Judge Allen: That is the ruling of the Court.

Judge Martin: May I ask this question, Mr. Jackson, just in the interest of time saving? Exhibit 513 is another money damage estimate opinion of this witness, Mr. Moreland.

Mr. R. T. Jackson: It is.

Judge Martin: Wouldn't that be more or less self-explanatory without very much statement from him? Couldn't you offer it and let it be rejected, and except, and save a good deal of time that way?

Mr. R. T. Jackson: I had only intended to ask him if he made it, and whether it accurately reflected his estimates and opinions.

Judge Martin: That is what I had in mind that we might get along quickly if the follow-up was the same as to the

money damage estimate, if it was not any different from exhibit No. 513; it would be excluded.

Mr. R. T. Jackson: Certainly so, your Honor."

The document (offered in evidence as Complainants' Exhibit 513) was prepared under my direction and, with the amendment in the title to show total "Estimated" damage by displacement, it accurately portrays the data and estimates which it purports to show.

"Mr. R. T. Jackson: We now offer exhibit No. 513 with the understanding that no objection is taken by counsel for defendant, and no reliance is placed by the Court in its ruling upon the circumstance that I have not asked Professor Moreland to take the time to go through and explain the reasoning and processes and data, from which he arrived at the opinions and estimates shown on the exhibit.

Judge Allen: Exhibit 513 is excluded upon the sole ground already stated. The Court does not care to go into the question of estimated money damages.

[fol. 810] Mr. R. T. Jackson: Please note an exception to the rulings on each of the exhibits rejected."

The document (offered in evidence as Complainants' Exhibit 514) was prepared under my direction. The estimates of annual and capital damages of each of the complainants shown on that document represent accurately my opinion and estimates as a result of the study which I made.

"Mr. R. T. Jackson: Now again with the understanding that no exception is taken by counsel for defendants, and that the court in ruling does not rely upon the fact that I have not had the witness explain in detail the foundation for this exhibit 514, I offer it in evidence.

Mr. Fly: We object to it, on the ground that the question of the amount of money damages as to each of the companies is irrelevant and immaterial, and upon the further ground that this estimate of capital damage which refers to the assumed loss to investors is also quite irrelevant, even on a point of damage to the company.

Mr. R. T. Jackson: I am a little confused by the last point of the objection as to whether or not that requires me to go into a development of the exhibit.

Judge Allen: I don't think it does.

Mr. Fly: The exhibit speaks for itself.

Judge Allen: The court sustains the objection upon the grounds heretofore stated with reference to exhibits 512 and 513. The Court might say that this is an Equity case. You are praying for an injunction here.

Mr. R. T. Jackson: That is correct.

Judge Allen: The Authority has conceded that its rates are substantially lower on all classes of service than those of the complainants, and the Court feels that so far as damage is concerned, substantial damage is shown, adequate for relief, if the complainants are entitled to relief under the law applicable to the case, so that the Court considers it unnecessary to go into details of money damage.

[fol. 811] Mr. R. T. Jackson: The Court appreciates we are merely making the record, in the event any court should entertain the view that it had some material value. May we have an exception?

Judge Allen: Yes."

Assuming that TVA were to postpone its ultimate installation as described in its reports to Congress beyond 1943, that in my opinion would not greatly affect the amount of damages which would be sustained by complainants by reason of duplication and loss of use of facilities, but would defer the time when the full effect of those damages was felt.

"Q. What is your estimate of the damages to the complainants by reason of duplication and loss of use of facilities and your estimate of damages to the complainants severally, in the event they are forced to adopt TVA rates?

Judge Allen: That is a question calling for an answer in money damages.

Mr. R. T. Jackson: Estimates of it, yes.

Judge Allen: The objection is sustained.

Mr. R. T. Jackson: And we note our exception and offer to prove that if the witness were permitted to answer he would say that:

As a result of my studies (which have been in part described in testimony admitted from this witness) of determination of the damages through the rendering idle of facilities, I have estimated that the loss within the 100 mile radius to the complainants would be upwards of \$46,000,000; within the 150 mile radius, upwards of \$27,000,000; and within the 250 mile radius upwards of \$24,000,000.

Because of the influence of transmission costs it seems unlikely that TVA will extend its service generally over an area as large as the total area involved within the 250 mile radius of any of the TVA plants or proposed plants.

On the other hand, it seems probable that it may extend service well beyond the 100 mile radius. For this reason, and my opinion of the likelihood that the TVA will proceed to serve areas of greater density somewhat nearer the points of production, I have estimated that the major part of displacement will take place somewhere within the [fol. 812] 150 mile radius, and on the basis of these probabilities estimate then that the minimum probable loss from duplication and loss of use of facilities, will be something in the order of the arithmetical average of the losses in each of the three zones, or about \$33,000,000.

In making my estimates of the displacement of sales and resulting idleness of facilities, I have considered only the amount of displacement which would be caused by the quantity of power which Tennessee Valley Authority will have available upon completion of the unified plan over and above the set requirements of its present business, including therein TVA government operation and present TVA customers.

I have made a study of the type of damage which would result to the complainants from being forced by competition with TVA to reduce their rates to TVA levels, and I have found from this study that the gross revenue of the complainant companies will be reduced approximately \$21,000,000 per year, and that the number of KW. hours sold, and the number of customers served at the reduced rates will be increased to such an extent as to involve an additional cost of approximately \$5,000,000 per year for service, making a total annual damage to complainant companies amounting to approximately \$26,000,000; that the capital value of this annual damage is approximately \$433,000,000, this being the capital value of utility company securities owned by investors upon which an income equal to the annual damage would have paid an average rate of 6 per cent per annum; that I have caused to be prepared an exhibit reflecting the estimated damage to the complainant companies which would result, if forced by competition to reduce rates to TVA levels; that in my opinion the companies will be forced to reduce their rates to these levels;

that the data reflected upon this tabulation which was offered as Complainants' Exhibit No. 514 and excluded by the Court correctly reflects my estimate of this damage.

I have not made any specific estimate of damage of this nature to the Southern Tennessee Power Company, but in my opinion, indirectly through the displacement of loads for which its facilities now transmit electric power it will sustain substantial damage."

The sketch (offered and received in evidence as Complainants' Exhibit 515) indicates pictorially the various elements in a generating, transmission and distribution system. Electric energy is ordinarily generated at voltages in [fol. 813] large power stations of 13,000 to 20,000 volts. It is then stepped up through transformers to a higher voltage for transmission. This sketch indicates a hydro plant and steam plant with a transmission line between them, "A primary transmission line", which is a transmission line at relatively high voltage used for bulk transmission of power. This sketch is necessarily so condensed that it does not indicate that primary transmission lines are ordinarily relatively long, as compared with secondary transmission and rural lines.

The voltage is stepped down from the primary voltage in some cases directly from the high voltage to low voltage suitable for distribution, but more frequently to a lower transmission voltage which is called on this sketch "secondary transmission". From the secondary transmission it passes through step-down transformers at substations, which transform the voltage from transmission voltage to a voltage suitable for distribution. When power is sold on the secondary or low voltage side of a substation, it means it is sold at the lower voltage and that the selling agency bears the expense of providing the step-down transformers and the losses taking place in the transformers. Some large industries are served directly from primary lines and some industries are served from secondary lines. From secondary sub-stations there are both rural lines for rural service, distribution lines for villages and so on. The pictures around the margin of Complainants' Exhibit 515 indicate examples of various types of substations and transmission lines.

Stepping down the current is the process which induces a lower voltage on the low voltage side of the transformer [fol. 814] and the current that is served from that transformer is at the lower voltage. The usual distribution systems in a town or village, or in any except the smallest size towns, consist of circuits that are commonly known as primary distribution circuits, usually operated at 2300 volts or at 4000 volts, and customers' transformers are located along these lines. They serve customers direct, by stepping the voltage down to a 230 or 115 volt service for direct connection to the smaller customers.

To give the meaning of an induced current involves a somewhat technical explanation. A transformer consists of a series of windings or coils. The current flows through one coil, inducing a magnetic field, and that magnetic field passes through another coil and produces voltage, and as the circuit is closed, the current flows through the second coil, and the transformed current is induced. A single phase transformer has two coils, one with many turns and one with few turns, and the voltages are in direct proportion to the number of turns. If there are, for example, 1,000 turns on one side and one hundred on the other, if the coils with 1,000 turns are connected across a line that had 1,000 volts potential, on the other side you would get a potential voltage of one-tenth, in direct ratio to the number of turns. That is the theoretical ratio, but actually there is a little variation on account of losses. It is the flow of current in the first coil that produces a flow of current in the second. It is an entirely separate circuit, but one induces the flow in the other, and one supplies power to the other, although the current itself does not flow through it. The low side is where it comes out after this process has taken place.

(The witness was excused.)

[fol. 815]

OFFERS IN EVIDENCE

"Mr. S. D. L. Jackson: If the Court please, in accordance with the statement made by the defendants early in this trial that they would furnish us with copies of certain resolutions, we have been furnished copies of certain resolutions by the defendants, and have selected from those resolutions

certain documents which we now desire to offer as exhibits in the record. The documents which I have, and which have been numbered, are the actual documents furnished to us by the defendants, and I understand there is no question about the authenticity of them.

Mr. Fitts: There is no question about the authenticity."

Thereupon counsel for complainants offered in evidence and the Court received as Complainants' Exhibits 516 to 567, inclusive, copies of the following resolutions of the TVA Board of Directors approving allotment releases attached thereto:

Complainants' Exhibit 516, being a resolution dated July 23, 1935 approving an allotment release for \$12,127.00 for the construction of four miles of rural line in Lee County, Mississippi.

Complainants' Exhibit 517, being a resolution dated July 25, 1935 approving an allotment release of \$11,495.00 to construct 7½ miles of transmission line in Union County, Mississippi.

Complainants' Exhibit 518, being a resolution dated August 29, 1935 approving an allotment release for \$1,891.00 for the construction of a rural line in Prentiss County, Mississippi.

Complainants' Exhibit 519, being a resolution dated October 10, 1935 approving an allotment release of \$102,770.00 for the construction of a 44 K.V. line from Tupelo to New Albany, Mississippi.

Complainants' Exhibit 520, being a resolution dated November 18, 1935 approving an allotment release entitled "600 K.V.A. Transformer at Corinth Steam Plant."

Complainants' Exhibit 521, being a resolution dated January 11, 1936 approving an allotment release for \$189,587.00 for the construction of the "Pulaski-Columbia-Dickson Line and Substation."

Complainants' Exhibit 522, being a resolution dated January 11, 1936 approving an allotment release for \$597,420.00 for the "Wheeler Dam-Columbia Transmission Line and Columbia Substation."

Complainants' Exhibit 523, being a resolution dated January 11, 1936 approving an allotment release for the construction of rural lines for the City of Dayton, in Rhea County, Tennessee.

[fol. 816] Complainants' Exhibit 524, being a resolution dated January 11, 1936 approving an allotment release for the "Bodenham Extension from Pulaski, Giles County, Tennessee."

Complainants' Exhibit 525, being a resolution dated January 11, 1936 approving an allotment release for "Construction of Substation west of Ardmore, Lincoln County, Tennessee."

Complainants' Exhibit 526, being a resolution dated January 11, 1936 approving an allotment release entitled "Mantachie-Kirkville-Marietta Line, Itawamba County, Mississippi."

Complainants' Exhibit 527, being a resolution dated January 11, 1936 approving an allotment release for the "Construction of a rural electric line in Lee County, Mississippi."

Complainants' Exhibit 528, being a resolution dated January 11, 1936 approving an allotment release for the "Construction of rural electric lines in south half of Lincoln County, Tennessee."

Complainants' Exhibit 529, being a resolution dated January 18, 1936 approving an allotment release for "Gravel pit line extension to Bigbee, Monroe County, Mississippi."

Complainants' Exhibit 530, being a resolution dated January 18, 1936 approving an allotment release for "Rural electric line construction in Hardin and McNairy Counties, Tennessee."

Complainants' Exhibit 531, being a resolution dated January 18, 1936 approving an allotment release for "Bedford County, Tennessee, Rural Electrification Project."

Complainants' Exhibit 532, being a resolution dated March 17, 1936 approving an allotment release for "Extension of transmission system to Milan, Bolivar and Somerville, Tennessee."

Complainants' Exhibit 533, being a resolution dated March 17, 1936 approving an allotment release for the "Rural electrification project in Gibson County, Tennessee."

Complainants' Exhibit 534, being a resolution approving an allotment release for the "Pratt Single-phase Rural Line Extension for Prentiss County Association, Prentiss and Lee Counties, Mississippi."

Complainants' Exhibit 535, being a resolution dated April 14, 1936 approving an allotment release for "Rural line con-

struction in Catoosa County, Georgia, for the North Georgia Electric Membership Corporation."

Complainants' Exhibit 536, being a resolution dated June 19, 1936 approving an allotment release for the construction of the transformer station at Ooltewah, Tennessee.

Complainants' Exhibit 537, being a resolution dated June 29, 1936 approving an allotment release for rural line construction for the North Georgia Electric Membership Corporation.

Complainants' Exhibit 538, being a resolution dated July 1, 1936 approving an allotment release for "Cullman County, Alabama, Rural Electrification Project."

[fol. 817] Complainants' Exhibit 539, being a resolution dated July 6, 1936 approving an allotment release for the construction of the transmission line from Pickwick Landing Dam to the City of Memphis.

Complainants' Exhibit 540, being a resolution dated July 14, 1936 approving an allotment release for the construction of rural lines for the Meigs County Electric Membership Corporation.

Complainants' Exhibit 541, being a resolution dated August 21, 1936 authorizing an allotment release for the construction of a substation in the south side of Memphis.

Complainants' Exhibit 542, being a resolution dated September 5, 1936 approving an allotment release for the construction of additional rural lines in Lincoln County, Tennessee.

Complainants' Exhibit 543, being a resolution dated September 21, 1936 approving an allotment release for "Rural electrification project, Rutherford and Wilson Counties, Tennessee,—Transmission line construction for the Middle Tennessee Electric Membership Corporation."

Complainants' Exhibit 544, being a resolution dated September 23, 1936 approving an allotment release for the construction of rural lines for the City of Athens in Limestone County, Alabama.

Complainants' Exhibit 545, being a resolution dated September 25, 1936 approving an allotment release for the engineering survey and the right of way of the Jackson-Trenton 44 K. V. line and substation.

Complainants' Exhibit 546, being a resolution dated October 6, 1936 approving an allotment release for the construction of rural lines in Cullman County, Alabama.

Complainants' Exhibit 547, being a resolution dated October 22, 1936 approving an allotment release for the construction of an extension of the Mimosa rural line in Lincoln County, Tennessee.

Complainants' Exhibit 548, being a resolution dated October 26, 1936 approving an allotment release for rebuilding the rural line of the city of New Albany, Mississippi.

Complainants' Exhibit 549, being a resolution dated December 7, 1936 approving an allotment release for the construction of rural lines for the Gibson County Electric Membership Corporation.

Complainants' Exhibit 550, being a resolution dated December 7, 1936 approving an allotment release for the construction of rural lines for the Southwest Tennessee Electric Membership Corporation.

[fol. 818] Complainants' Exhibit 551, being a resolution dated February 5, 1937 approving an allotment release for the construction of rural lines for the Duck River Electric Membership Corporation.

Complainants' Exhibit 552, being a resolution dated February 16, 1937 approving an allotment release for the construction of rural lines and for repairs for the Tombigbee Electric Power Association.

Complainants' Exhibit 553, being a resolution dated April 9, 1937 approving an allotment release for the construction of rural lines in Franklin County, Alabama.

Complainants' Exhibit 554, being a resolution dated May 15, 1937 approving an allotment release for additions to the Tupelo and Pontotoc substations.

Complainants' Exhibit 555, being a resolution dated May 15, 1937 approving an allotment release for the construction of rural lines in Lawrence and Morgan Counties, Alabama.

Complainants' Exhibit 556, being a resolution dated May 15, 1937 approving an allotment release for the construction of an extension of the rural line to New Harmony for the City of New Albany, Mississippi.

Complainants' Exhibit 557, being a resolution dated June 3, 1937 approving an allotment release for the construction of the Pontotoc-Sardis transmission line and the Sardis substation for the U. S. Army Engineers.

Complainants' Exhibit 558, being a resolution dated June 3, 1937 approving an allotment release for additional changes to the Hartselle substation.

Complainants' Exhibit 559, being a resolution dated June 3, 1937 approving an allotment release for the extension of rural lines and substation which is for the Tishomingo County Electric Power Association.

Complainants' Exhibit 560, being a resolution dated July 2, 1937 approving an allotment release for the construction of the North Side Memphis substation.

Complainants' Exhibit 561, being a resolution dated July 2, 1937 approving an allotment release for the construction of additions to the South Memphis substation for service to Arkansas.

Complainants' Exhibit 562, being a resolution dated July 2, 1937 approving an allotment release for the construction of a 110 K. V. transmission line from Memphis to Arkansas.

Complainants' Exhibit 563, being a resolution dated July 2, 1937 approving an allotment release for the construction of the South Memphis-North Memphis 110 K. V. transmission line.

[fol. 819] Complainants' Exhibit 564, being a resolution dated July 23, 1937 approving an allotment release for \$269,000.00 for service to Volunteer Portland Cement Company.

Complainants' Exhibit 565, being a resolution dated August 13, 1937 approving an allotment release for the construction of rural lines for the Duck River Electric Membership Corporation.

Complainants' Exhibit 566, being a resolution dated August 13, 1937 approving an allotment release for the construction of rural lines for the Southwest Tennessee Electric Membership Corporation.

Complainants' Exhibit 567, being a resolution dated September 13, 1937 approving an allotment release for transmission system reinforcement in Middle Tennessee.

[fol. 820] The power contract between TVA and the Tip-pah County Electric Power Association dated November 5, 1937 was at this point delivered to complainants by counsel for defendants and was offered and received in evidence as Complainants' Exhibit 224.

"Mr. S. D. L. Jackson: Mr. Fly, may we at this time have the assurance of the Authority that we now have had produced, and there are in evidence here all of the power con-

tracts of the Authority? We have discussed that from time to time.

Mr. Fly: That is correct, sir. We have supplied all of our contracts to him.

Judge Allen: The Court has discussed from the inception of this case, bearing in mind the pleadings filed, and bearing in mind the very helpful briefs that have been filed on both sides, with reference to questions of materiality and relevancy, we have all felt that wherever there is doubt as to the admissibility of evidence, it should be received.

The admission in evidence of such documents and testimony does not constitute a final ruling as to its relevancy, competency and materiality. Nor does it mean that the Court will make findings of fact based upon the circumstances disclosed thereby, if the findings of fact offered by the respective parties are deemed immaterial or irrelevant to the issues in this case, and to its decision such proposed findings will be rejected.

In other words, the Court is not accepting proffered testimony of this kind because we consider there is a doubt as to its admissibility, and it is the policy of the Court to be liberal with reference to its admission."

Counsel for complainants offered in evidence and the Court received as Complainants' Exhibits 568-627, inclusive, copies of the following resolutions and extracts from the minutes of the Board of Directors of TVA together with certain documents and contracts attached thereto:

Complainants' Exhibit 568, being a resolution dated October 16, 1933, approving contracts to supply power to Florence, Tuscumbia, Sheffield, Muscle Shoals and other municipalities along the Tupelo transmission line.

Complainants' Exhibit 569, being an extract from the minutes dated December 15, 1935, granting authority to Mr. Lilienthal to create a corporation under the laws of Delaware to enter the business of discounting commercial paper.

[fol. 820a] Complainants' Exhibit 570, being a resolution dated December 16, 1933, approving the project, (attached to the resolution), entitled "Construction of Rural Electric Transmission Lines in the Five Mississippi Counties of Lee, Pontotoc, Monroe, Alcorn and Tishomingo and in Lauderdale County, Alabama."

Complainants' Exhibit 571, being a resolution dated April 13, 1934, approving the contract for advertising services by TVA with the firm of Young & Rubicam, Inc., at a lump sum payment of \$10,000.

Complainants' Exhibit 572, being a resolution dated June 3, 1937, authorizing Dr. Morgan to write the letter dated June 4, 1937, attached to the resolution, to the War Department with regard to the construction of transmission line to Sardis Dam.

Complainants' Exhibit 573, being a resolution dated October 5, 1937, adopting the recommendations of the TVA Assistant Chief Engineer, Carl A. Bock, concerning the construction of power houses at Chickamauga and Guntersville Dams and set out in his memorandum to the General Manager, dated October 5, 1937, attached to the resolution.

Complainants' Exhibit 574, being a resolution dated July 30, 1933, authorizing the construction of a transmission line from Wilson Dam to Cove Creek.

Complainants' Exhibit 575, being a resolution dated October 16, 1933, stating that every contract for power between TVA and municipalities be made to contain certain provisions, set forth in the memorandum attached to the resolution.

Complainants' Exhibit 576, being a resolution dated October 16, 1933, approving the "Wholesale rate schedule for Tupelo," which schedule was attached to the resolution.

Complainants' Exhibit 577, being a resolution dated May 31, 1934, approving the contract, dated June 1, 1934, attached to the resolution, between TVA and the Alcorn County Electric Power Association.

Complainants' Exhibit 578, being a series of resolutions dated July 27, 1934, referring to the contract between the Tennessee Public Service Company and TVA for the sale of the Knoxville properties and the contract between TVA and the Carolina Power & Light Company, attached to the resolution, by which the Carolina Power & Light Company was to supply power to TVA for distribution in the City of Knoxville prior to the time when Norris and Wheeler Dams are completed and in operation.

(Counsel for defendants then offered in evidence and the court received as Defendants' Exhibit 28 a resolution of the Board of Directors of TVA dated March 5, 1936 formally

terminating and rescinding the contract dated July 26, 1934 between TVA and the Tennessee Public Service Co.)

Complainants' Exhibit 579, being a resolution relating to the Young & Rubicam contract referred to in Complainants' Exhibit 571.

Complainants' Exhibit 580, being a resolution dated October 9, 1934, which refers to and has attached thereto resolution No. 767 of the City Council of Knoxville, Tennessee.

Complainants' Exhibit 581, being a resolution dated March 18, 1935, authorizing and approving entry by TVA into a contract, attached to the resolution, with the Electric Home and Farm Authority, Inc.

"Mr. S. D. L. Jackson: Now, the exhibit referred to in that resolution which is attached is an agreement made and entered into as of July 1, 1934, between Electric Home & Farm Authority, Inc., that is the first company, a corporation organized and existing under the laws of the State of Delaware, in its individual corporate capacity, hereinafter called 'Authority'; Electric Home & Farm Authority as trustee under a trust deed executed in May, 1934, as amended, to secure an issue of notes to aggregate not in excess of ten million dollars, hereinafter called 'Trustee'; [fol. 822] and Tennessee Valley Authority, a corporation organized and existing under and by virtue of the Tennessee Valley Authority Act of 1933, hereinafter called 'Utility'.

Now, I might say, if your Honor please, in reference to this matter, in July of this year we took the deposition of Mr. Hobson, who is now either the general manager or head administrative officer or second head administrative officer of the present E. H. & F. A., the District of Columbia corporation which succeeded the original Delaware corporation.

And he produced this contract and said that it was still the contract in existence between the present E. H. & F. A., and the Tennessee Valley Authority. That is the contract carried over. It was made with the original company, and then the successor, E. H. & F. A., carried on, and they are still carrying on under this contract.

Judge Allen: But the personnel of the directorate is different?

Mr. S. D. L. Jackson: That is right. It is no longer identical as to personnel, but it is,—the second company is still carrying on, or at least was at the end of July of this

year, under the contract between TVA and the original company.

Judge Allen: Yes.

Mr. Fly: I believe there is no doubt as to the accuracy of Mr. Jackson's statement. That is a contract setting forth the business relations and the trust agreement between the two parties, and as I understand it the same form of contract is used by EHFA with Mr. Jackson's clients.

Mr. S. D. L. Jackson: I would say all other utilities."

Complainants' Exhibit 582, being a resolution dated May 7, 1935, approving an agreement dated April 23, 1935, attached to the resolution, between TVA and the City of Athens, Alabama.

Complainants' Exhibit 583, being a resolution dated July 25, 1935, approving a contract dated July 19, 1935, attached to the resolution, between TVA and Tishomingo County Electric Power Association.

Complainants' Exhibit 584, being a resolution dated November 16, 1935, approving a contract dated October 19, 1935, attached to the resolution, between TVA and Tombigbee Electric Power Association.

Complainants' Exhibit 585, being a resolution dated November 16, 1935, approving a contract dated November 2, 1935, with the City of Dayton, entitled "Agreement for Cooperation in Construction of Rural Lines."

[fol. 823] Complainants' Exhibit 586, being a resolution dated November 16, 1935, approving a supplementary contract dated August 26, 1936, attached to the resolution, between TVA and Alcorn County Electric Power Association.

Complainants' Exhibit 587, being a resolution dated December 20, 1935, approving a contract, dated December 16, 1935, attached to the resolution, between TVA and New Albany, Mississippi.

Complainants' Exhibit 588, being a resolution dated December 23, 1935, approving the contract dated October 1, 1935, attached to the resolution, between TVA and Lincoln County Electric Membership Corporation.

Complainants' Exhibit 589, being a resolution dated December 31, 1935, approving a supplementary contract dated December 31, 1935, attached to the resolution, between TVA and Alcorn County Electric Power Association.

Complainants' Exhibit 590, being a resolution dated January 10, 1936, authorizing construction of a dam on the Hiwassee River on the Fowler Bend site.

Complainants' Exhibit 591, being a resolution dated December 31, 1935, authorizing construction of Chickamauga Dam.

Complainants' Exhibit 592, being a resolution dated January 18, 1936, approving a sale and loan contract dated January 15, 1936, attached to the resolution, between TVA and Monroe County Electric Power Association.

Complainants' Exhibit 593, being a resolution dated February 1, 1936, approving a contract dated January 24, 1936, between TVA and Dayton, Tennessee, for the sale of rural lines.

Complainants' Exhibit 594, being a resolution dated February 10, 1936, approving a contract dated February 14, 1936, attached to the resolution, between TVA and the City of Amory.

Complainants' Exhibit 595, being a resolution dated February 11, 1936, approving a sale and loan contract dated February 12, 1936, attached to the resolution, between TVA and Pontotoc County Electric Power Association.

Complainants' Exhibit 596, being a resolution dated February 11, 1936, approving a contract dated February 1, 1936, attached to the resolution, between TVA and Monroe County Electric Power Association, concerning the operation of rural lines and the collection of bills.

Complainants' Exhibit 597, being a resolution dated April 27, 1936, approving a contract dated April 21, 1936, attached to the resolution, between Alcorn County Electric Power Association, Pickwick Electric Membership Corporation and TVA.

[fol. 824] Complainants' Exhibit 598, being a resolution dated April 27, 1936, approving the execution of a quit claim deed from the TVA to the Alcorn County Electric Power Association.

Complainants' Exhibit 599, being a resolution dated April 27, 1936, approving a contract dated April 21, 1936, attached to the resolution, between Pickwick Electric Membership Corporation and TVA.

Complainants' Exhibit 600, being a resolution dated April 27, 1936, approving a contract dated April 21, 1936, attached to the resolution, between TVA and Alcorn County Electric Power Association.

Complainants' Exhibit 601, being a resolution dated May 28, 1936, approving an operation contract dated May 18, 1936, attached to the resolution, between Bedford County Electric Membership Corporation and TVA.

Complainants' Exhibit 602, being a resolution dated July 31, 1936, approving an amendment, attached to said exhibit, to the contract dated May 1, 1936, between the Meigs County Electric Membership Corporation and TVA.

Complainants' Exhibit 603, being a resolution dated August 11, 1936, approving a contract dated August 4, 1936, attached to the resolution, between TVA and Cullman County Electric Membership Corporation.

Complainants' Exhibit 604 is a resolution dated August 21, 1936, approving a sale and loan agreement dated August 13, 1936, attached to the resolution, between TVA and Gibson County Electric Membership Corporation.

Complainants' Exhibit 605, being a resolution dated September 5, 1936, approving an agreement dated August 26, 1936, attached to the resolution, between TVA and Pickwick Electric Membership Corporation.

Complainants' Exhibit 606, being a resolution dated September 5, 1936, approving a supplementary contract dated May 25, 1936, attached to the resolution, between TVA and Milan, Tennessee.

Complainants' Exhibit 607, being a resolution dated September 5, 1936, approving a contract for the sale of properties dated October 9, 1936, attached to the resolution, between TVA and the City of Athens, Alabama.

Complainants' Exhibit 608, being a resolution dated December 23, 1936, approving a contract dated December 9, 1936, attached to the resolution, between TVA and Southwest Tennessee Electric Membership Corporation.

Complainants' Exhibit 609, being a resolution dated December 23, 1936, approving a contract dated October 31, 1936, attached to the resolution, between TVA and Duck River Electric Membership Corporation.

[fol. 825] Complainants' Exhibit 610, being a resolution dated January 8, 1937, approving an operation contract, attached to the resolution, between TVA and Lincoln County Electric Membership Corporation.

Complainants' Exhibit 611, being a resolution dated February 11, 1937, approving an operation contract dated January 26, 1937, attached to the resolution, between TVA and Tishomingo County Electric Power Association.

Complainants' Exhibit 612, being a resolution dated February 11, 1937, approving a supplementary contract dated February 2, 1937, attached to the resolution, between TVA and Holly Springs, Mississippi.

Complainants' Exhibit 613, being a resolution dated March 10, 1937, approving a contract dated March 17, 1937, attached to the resolution, between TVA and Dayton, Tennessee.

Complainants' Exhibit 614, being a resolution dated March 31, 1937, approving a contract dated April 1, 1937, attached to the resolution, entitled "Emergency Operation Contract between TVA and Alcorn County Electric Power Association."

Complainants' Exhibit 615, being a resolution dated April 9, 1937, approving the transfer of certain franchises from TVA to the Southwest Tennessee Electric Membership Corporation.

Complainants' Exhibit 616, being a resolution dated April 9, 1937, approving a supplementary contract dated March 24, 1937, attached to the resolution, between TVA and Okolona, Mississippi.

Complainants' Exhibit 617, being a resolution dated June 3, 1937, authorizing the construction of 110 kv. transmission line between Norris Dam and Volunteer Portland Cement Company.

Complainants' Exhibit 618, being a resolution dated June 3, 1937, approving a contract dated March 20, 1937, attached to the resolution, between TVA and Bolivar, Tennessee.

Complainants' Exhibit 619, being a resolution dated June 9, 1937, approving a contract with the Electric Power Board of Chattanooga, Tennessee.

Complainants' Exhibit 620, being a resolution dated June 23, 1937, approving a contract entitled "Emergency Operation Contract between TVA and Dickson, Tennessee," dated June 11, 1937, attached to the resolution.

Complainants' Exhibit 621, being a resolution dated July 12, 1937, granting an extension of time to the Monroe County Electric Power Association for the first payment of principal on its indebtedness to the TVA.

Complainants' Exhibit 622, being a resolution dated July [fol. 826] 20, 1937, approving a supplementary contract dated July 23, 1937, attached to the resolution, between TVA and Athens, Alabama.

Complainants' Exhibit 623, being a resolution dated July 29, 1937, approving a contract dated July 14, 1937, attached to the resolution, entitled "Emergency Operation Contract between TVA and Pickwick Electric Membership Corporation."

Complainants' Exhibit 624, being a resolution dated July, 29, 1937, approving a contract dated May 14, 1937, attached to the resolution, between TVA and Joe Wheeler Electric Membership Corporation for the sale and construction of rural lines.

Complainants' Exhibit 625, being a resolution dated August 13, 1937, approving a letter of that date, attached to the resolution, from Mr. Lilienthal to Mr. Dempster, City Manager, of Knoxville, Tennessee.

Complainants' Exhibit 626, being a resolution dated August 13, 1937, approving a supplementary contract dated June 29, 1937, attached to the resolution, between TVA and Lincoln County Electric Membership Corporation.

Complainants' Exhibit 627, being a resolution dated September 24, 1937, unanimously approving the schedule of generator installations at the various dam projects, and listing the units and dates of proposed initial operation.

"Mr. Fitts: I think we ought to have it appear, Mr. Jackson, that these are just some of the resolutions that we furnished you, and not all, and also with respect to the exhibits to the various resolutions, that they were made available to you, and if any of them are missing there you did have the opportunity to get them, and can get them now if you still want them.

Mr. S. D. L. Jackson: That I think is correct. Mr. Fitts stated that he would furnish to us resolutions relating to the power phases of the TVA.

We received from them some 250, I would say, or possibly more, resolutions. I guess perhaps we received more than that, nearer 400.

From those we selected the group that we have offered in evidence. When the resolutions were first furnished they did not have the exhibits referred to in the resolutions attached, and we thereupon requested that we might see the exhibits and were permitted to see the exhibits, all that we asked to see, of any of the resolutions that had been furnished. Of course, we do not want the record to show that we have

stated that we have inspected all of the records of TVA insofar as they may relate to power.

Mr. Fly: I think we can agree upon that.

[fol. 827] Mr. S. D. L. Jackson: At this time, if the Court please, I desire to offer in evidence an extract from a hearing before the Committee on Military Affairs, House of Representatives, 72nd Congress, First Session, which was a hearing before the Committee on Military Affairs that related to Muscle Shoals in the year 1932. It was prior to the passage of the Tennessee Valley Authority Act.

Mr. Fly: Is this testimony.

Mr. S. D. L. Jackson: Now, wait a minute.

Mr. Fly: Don't get too far.

Mr. S. D. L. Jackson: All right. Now, at that hearing, General Brown, who at that time was the Chief of Army Engineers, and who I believe is the Chief of Engineers that made and submitted to Congress the report which is in this record as exhibit No. 105, the first document we started with, as the Court will recall, he appeared before the Congress to make his report to the Military Affairs Committee, and in connection with that hearing he was asked by certain members of that Committee for certain information with respect to Muscle Shoals.

Now, I have one extract from that book that I desire to offer in evidence. I don't know whether the Court desires me to have the entire book marked as an exhibit, there is just one extract in it, but I will be very glad to submit it to the Court for examination.

Judge Allen: This was prior to the enactment of the Tennessee Valley Authority Act?

Mr. S. D. L. Jackson: Yes, your Honor, it was, the year before the Tennessee Valley Authority Act was enacted by Congress. However, I might say it is the same Committee of Congress, the Military Affairs Committee is the same committee that considered the Tennessee Valley Authority Act and the amendment to it. And of course in our view General Brown's statement to a Congressional Committee is, just as his report to Congress was, an official report that he made as Chief of Engineers which appears in House Document 328, and which is exhibit No. 105. He made a report relating to the Tennessee River.

Judge Allen: The objection is sustained.

The Court is sustaining this objection, not upon the ground that it is offered as an excerpt, although if the

Court considers that this excerpt had any admissibility it would adhere to its former ruling, and introduce the entire report of the hearing. The Court will not extend the ruling which it has made with reference to statements made to committees of the House.

[fol. 828] The Court has already ruled that it will not receive in evidence statements made even by officers of this Board, such as Mr. Lilienthal, before a House Committee which was inquiring into some other subject than the enactment of legislation dealing directly with the Tennessee Valley Authority, such as the Wheeler-Rayburn bill.

Neither will the Court extend its ruling to receive in evidence statements made by other persons than these directors in hearings before House Committees, which, as are shown, have no possible relevancy or materiality to the issues of this case.

Mr. S. D. L. Jackson: May we have an exception to the Court's ruling?

Judge Allen: You may have an exception.

Mr. S. D. L. Jackson: Now, may I ask the Reporter to copy into the record this rather brief statement?

Judge Allen: You may have it copied into the record and you may have your exception. The Court rules it is immaterial and irrelevant and excludes it.

(Said excluded excerpt being in words and figures following:)

'Muscle Shoals

Hearing before the Committee on Military Affairs, House of Representatives, Seventy-second Congress, First Session, Part 1.

Mr. May: Now, independent of any power connection whatever, do you regard the building of Cove Creek Dam as a feasible proposition for navigation purposes only?

General Brown; No; by no means.

Mr. May: Do you not think that the storage of water that would be provided by this high dam at that point would augment the continuous supply of water below the dam clear down to Wilson Dam that would make it a profitable investment as a navigation proposition?

General Brown: I wouldn't think so. I wouldn't ever think of building a reservoir up there for navigation purposes only.

Mr. May: Well, would it justify it as a flood-control proposition?

General Brown: Well, that is another thing that is very difficult for the Federal Government to handle, flood control. [fol. 829] I don't think it is any business of the Federal Government to provide local flood control of waters. If people were suffering from floods up there locally and would contribute to the Federal Government's effort for the benefits that would come out of flood control, I would say, all right. But we have only two flood-control projects in the United States today by the Federal Government, one on the Mississippi River and the other in California on the Sacramento. That is all we have.

Mr. May: You have no plans for the immediate consideration of the proposition of building Cove Creek Dam there, and merely made up an estimate there of the cost of it for the use of this committee?

General Brown: No, sir. We have no plans in the Engineers' Department for building Cove Creek, although we have developed some plans on order of Congress to show what is practicable there. But for purposes of navigation we have no desire to build a Cove Creek reservoir.

Mr. May: The navigation of the river is possible with the low dams that you contemplate?

General Brown: Exactly; and that is the cheapest way to get it, working for navigation only.' "

[fol. 830] WENDELL L. WILLKIE was called as a witness on behalf of complainants and, having been first duly sworn, was examined and testified as follows:

Direct examination:

I reside in New York City and am President of The Commonwealth & Southern Corporation which owns 99% plus of the common stock of The Tennessee Electric Power Company. It is the largest preferred stockholder of that company and likewise the largest bondholder. It owns all of the common stock of the Mississippi Power Company and is the largest bondholder and preferred stockholder of that company. It owns all of the common stock of the Alabama Power Company and is the largest preferred stockholder of that company.

From the latter part of 1935 until the middle of 1936, there were negotiations being conducted for the sale of a block of electric power by The Tennessee Electric Power Company to the Monsanto Chemical Company at its plant at Columbia, Tennessee.

Examination by the Court:

The Monsanto Chemical Company has a large plant at Anniston, Alabama, and for many years was one of the largest consumers of power of the Alabama Power Company. In the latter part of 1935, they located a plant at Columbia, Tennessee. So far as I know the Monsanto Chemical Company is located at St. Louis, Missouri. Its exact legal title I cannot tell. I think it is incorporated under the laws of Missouri. Its principal office is St. Louis. I do not know more than one corporation by that name.

In the fall of 1936, Mr. E. A. Yates, who is directly responsible to me in The Commonwealth & Southern Corporation, together with James A. Longley, Vice President of The Tennessee Electric Power Company, Mr. Jo Guild, President of that company, together with other engineers, were in negotiations with Monsanto Chemical Company about supplying them power at their plant which they were locating at Columbia, Tennessee.

Direct examination continued:

The telegram (offered and received in evidence as Complainants' Exhibit 628) from Mr. Edgar M. Queeny, President of the Monsanto Chemical Company, was sent me on May 13, 1936 and received by me in my office in New York. This telegram refers to a transaction involving a proposed agreement between the Monsanto Chemical Company and The Tennessee Electric Power Company by which The Tennessee Electric Power Company was to sell to the Monsanto Chemical Company, as I recall, 50,000 kilowatts of capacity of electric power at its proposed plant at Columbia, Tennessee.

I am also President of the Commonwealth & Southern Corporation of New York, which has a mutual service arrangement with The Tennessee Electric Power Company and acts for it. I am not generally an agent of the Tennessee Electric Power Company, but I am an agent of that com-

pany in specific instances. In this particular instance I was specifically authorized to act for The Tennessee Electric Power Company. I was not authorized by a Board resolution. Mr. Guild, who is the General Manager, under the by-laws of The Tennessee Electric Power Company specifically authorized me to act in such transaction.

Mr. Guild reported to me that all of the details of the contract had been worked out with the Monsanto Chemical Company and were completely satisfactory to the Monsanto Chemical Company. All of the terms of the agreement had been agreed upon by both The Tennessee Electric Power [fol. 832] Company and the Monsanto Chemical Company. The Monsanto Chemical Company raised the question as to the financial responsibility of The Tennessee Electric Power Company in view of the operations of the TVA. The contract had not been executed but all the terms had been agreed upon. Mr. Queeny, President of the Monsanto Chemical Company, wired me. Pursuant to that wire Mr. Guild and I talked it over and through me The Tennessee Electric Power Company made the proposal to the Monsanto Chemical Company that there be deposited as a guarantee to the performance of the agreement a million and a half of the first mortgage bonds of The Tennessee Electric Power Company. Mr. Queeny declined to accept that, saying that in view of the situation in regard to the competitive operations of the TVA he did not consider that first mortgage bonds of The Tennessee Electric Power Company were a satisfactory guarantee of the performance of their agreement. His decision was conveyed to me in this telegram, Complainants' Exhibit 628, and Mr. Queeny also talked to me by telephone. Mr. Queeny is President. He may be Chairman of the Board, but he is the Chief Executive officer of the Monsanto Chemical Company.

The guarantee asked by Mr. Queeny in his telegram to the Commonwealth & Southern was not made or offered by me. No contract for power was consummated between The Tennessee Electric Power Company and the Monsanto Chemical Company. The Monsanto Chemical Company made the contract with the TVA.

"Q. Mr. Willkie, there has been a good deal of testimony in this case about actual and threatened competition between the Tennessee Valley Authority and complainants, including the Tennessee Electric Power Company, the Alabama

Power Company, and the Mississippi Power Company. Will you please state what, if anything, you have done to minimize or avoid the effect of this competition?

A. I have proposed repeatedly to the Tennessee Valley Authority—

Mr. Fly: I object. I think it is quite irrelevant as to what [fol. 833] has been done.

Judge Allen: The objection is sustained.

Mr. R. T. Jackson: And reserving our exception if the Court please, we offer to prove through the witness now on the stand, Mr. Willkie, that if he were permitted to testify in response to the question just asked he would testify that he has repeatedly proposed to the Tennessee Valley Authority and its directors on behalf of these power companies that such power companies by closing down their steam plants, by selling as much of the power presently produced by them as they could to other utilities on the outside of their service areas, and by taking losses on their business, they would purchase the surplus power over and above that required for governmental purposes, and redistribute the same throughout the entire southeast at rates which would recognize any differential between the price at which the TVA sold such power to them and the amount which it would cost the companies to produce such power, and would redistribute the TVA power under appropriate governmental regulations. That offer is declined, and we take our exception.

Judge Allen: The ruling stands and you may repeat your exception.

Mr. R. T. Jackson: I had not stated the purpose fully, and I just wanted to be sure that I apprised the court of everything that I should.

Mr. Willkie, would such an arrangement have resulted in a wide distribution of any power being produced by the Tennessee Valley Authority, and a wide distribution of any benefits that might arise from the low price at which the Authority was offering the power for sale?

Mr. Fly: I object to that as irrelevant.

Judge Allen: The objection is sustained.

Mr. R. T. Jackson: And we are allowed our exception and offer to prove that the witness now on the stand, Mr. Willkie, if permitted to answer the question, would testify

that such an arrangement would have provided a wider distribution and wider use of any power being produced by TVA than can be obtained by any other process short of ten years, and would have provided the widest possible distribution of any benefits that would inhere in the production or sale of TVA power among the people of Southeastern United States.

Q. Mr. Willkie, what price did you propose that such utilities would pay for such Tennessee Valley Authority power? These are, I assume, within the Court's ruling, but I am just completing the record.

Mr. Fly: I think that is clearly irrelevant, your Honor. [fol. 834] Judge Allen: The objection is sustained.

Mr. R. T. Jackson: We will take an exception and offer to show by the witness now on the stand, Mr. Willkie, that if permitted to testify he would say that they offered to the Tennessee Valley Authority to pay a price fixed by arbitration, by competitive bidding, and after the announcement by TVA of its so-called C-2 rate, at that rate, as might be elected by the Tennessee Valley Authority.

Q. Mr. Willkie, have these companies changed their attitude in the respects about which I have asked you in the preceding three or four questions? I assume that is also within the ruling.

Mr. Fly: I don't know what "attitude" means. If you can explain it perhaps I can understand.

Mr. Jackson: Well, you object to it, don't you?

Mr. Fly: I wonder if the witness understands.

Mr. R. T. Jackson: If he is permitted to answer—

The Witness: I am a little slow, Mr. Fly, but I think I get the point.

Mr. Fly: I suspect you have it, Mr. Willkie. That is what I was afraid of.

Judge Allen: Do you object, Mr. Fly?

Mr. Fly: I object to that question.

Judge Allen: The objection is sustained.

Mr. R. T. Jackson: Complainants take exception and offer to show by the witness now on the stand, Mr. Willkie, that if permitted to answer the question he would testify that there has been no change whatever in the attitude of these utilities with reference to the proposal for the distri-

bution of TVA power under the circumstances stated in previous offers of proof.

Mr. R. T. Jackson: Perhaps I had better ask leave to change the question and substitute for the word "Attitude" the word "position."

Judge Allen: The objection is still sustained.

Mr. R. T. Jackson: I understand. I will ask to have our exception and offer to prove still stand for the amended question.

Mr. Fly: There will be no cross examination.

The Witness: I am sorry."

(The witness was excused.)

[fol. 835] F. C. WEISS was called as a witness on behalf of the complainants and, having been first duly sworn, was examined and testified as follows:

Direct examination:

I am 46 years old, reside in Birmingham, Alabama, and am engineering and construction manager for the Alabama Power Company. I have studied and dealt with the properties of the Alabama Power Company for 25 years and am familiar with the construction of Lay Dam, Mitchell Dam and Jordan Dam. (Thereupon counsel for defendants stated that they raised no question about the qualifications of this witness to testify on this subject.)

I am familiar with the work which has been done by the Alabama Power Company at these dams directly and solely for the improvement of navigation and navigation facilities as distinguished from work affecting both navigation and power generation. No structures were provided by the Alabama Power Company at the Lay Dam project for a future navigation project at that site. No such structures were necessary. The topographical conditions were such that the best location for the lock was some distance away from the structure of the dam itself. The Lay Dam is Lock 12 and was constructed under a special act of Congress.

"Judge Allen: What is the purpose of the question?

Mr. Bemis: We are undertaking to show what was done in the construction of that dam under the special act of Congress, to show the complete facts.

Mr. Fly: I do not see that the details of what has been done is important. They have built the dam and operate it.

Judge Allen: Well, there is no contest between you over the construction that has been done by the Alabama Power Company?

[fol. 836] Mr. Fitts: I do not think so. I think we are perfectly willing to admit the construction of the dam.

Judge Allen: Is that all you expect to show?

Mr. Bemis: We expect to show what navigation facilities have been installed by reason of the act of Congress. That testimony will be very brief and complete with respect to this dam, the question involved.

Judge Allen: You may proceed."

The proposed lock at Lay Dam is on the east bank of the river, the upstream approach being in the second bay above the east abutment and extending through a natural draw some distance from the structure of the dam to the downstream pool below Lay Dam. The approaches to the Lock are some 2000 feet long. About 40 acres of land owned by the Alabama Power Company will be used at Lay Dam. To provide a navigable channel between Lay Dam and Mitchell Dam, it will be necessary to excavate an approach channel to the lower sill of the Lock around Lay Dam in order to secure proper depth of water to get into these lock facilities and into the lower pool. With reference to the nature of excavation required it will be necessary to remove some 80,000 yards of rock to excavate an approach channel. The company has made surveys in connection with the required excavation.

I am familiar with the work done by the Alabama Power Company directed to the construction of locks and channels for navigation at and above Mitchell Dam. The document (offered in evidence as Complainants' Exhibit 629) has plotted on it the soundings made at the upper reaches of the pool above Mitchell Dam and a study of the approach channel and the locks at the head of this reservoir. There were other like studies made in connection with that work. This is just one of the sheets. In the construction of Mitchell Dam provision was made on the east side of the river and in a part of the dam itself for the later construction of a lock through the dam. This construction included [fol. 837] the building of a rock fill on which there were

erected timber cribs, also filled with rock, which construction was for the lock channel approach on the upstream side of the dam. A portion of the lock was also installed in this east section of the dam and the excavations for the passage of the lock itself were closed with temporary structures. These improvements cost some \$80,400. About 40 acres of land owned by the Alabama Power Company at Mitchell Dam site will be necessary for the maintenance and operation of the navigation facilities.

At Jordan Dam the provisions for lockage through the dam are on the west side of the river. The topography is such that an extensive approach channel had to be excavated in the structure of the dam itself. A section of the lock wall was installed and a large amount of excavation of the lock chamber itself was done by the company. This construction work involved the excavation of some 190,000 or 200,000 yards of earth and 41,000 yards of rock and an equal amount of back filling and 9300 yards of concrete. This construction work at Jordan Dam cost slightly in excess of \$334,000. The proposed lock, together with the house for the lock keeper, will probably utilize about 40 acres of land owned by the Alabama Power Company.

In addition to these three dams, the Alabama Power Company has installed stream gauges upon the Coosa and Tallapoosa Rivers, solely for the aid of navigation, at a cost of slightly over \$5,400. The Alabama Power Company operates and maintains the gauges and weekly sends the readings to the Montgomery Office of the U. S. Geological Survey.

[fol. 838] Examination by the Court:

The Federal Power Commission licenses are for 50 years and the earliest construction under those licenses was started in the early 1920s.

Direct examination continued:

The table, (offered in evidence as Complainants' Exhibit 630), summarizes the cost of installation of these facilities devoted solely to navigation and the data set forth on that exhibit is correct to my knowledge.

The document, (offered in evidence as Complainants' Exhibit 631), contains a part of the application for the license for Jordan Dam. (The application from which the

excerpts in Exhibit 631 are taken was delivered to defendants and authenticated under the stipulation dated August 14, 1937.)

The tabulation, (offered in evidence as Complainants' Exhibit 632), shows the annual payments to the United States on account of licenses issued by the Federal Power Commission to the Alabama Power Company and the totals of those individual payments. The data shown on this exhibit is correct and is taken from the records of the Alabama Power Company.

"Mr. Bemis: If the Court please, we offer in evidence complainants' exhibits 629, 630, 631 and 632.

And I state further for the information of the Court that at the time these licenses and applications were offered through the witness, as I recall, Mr. Barry, the Court asked the question, what if anything had been done or paid for these licenses, and this testimony, among other things, answers that question.

Mr. Fly: I object to each and every one of these exhibits, your Honor, on the ground they are immaterial, irrelevant and incompetent, and tending to confuse the issues in this [fol. 839] case, and I think in a very burdensome way, that this sort of material will clutter up this record.

Judge Allen: Objection sustained to exhibits 629, 630, 631 and 632. They are excluded. You may have your exception."

(The witness was excused.)

[fol. 840] Counsel for complainants offered in evidence as Complainants' Exhibit 633 the press release entitled "Power Policy of the Tennessee Valley Authority", and as Complainants' Exhibit 634 the press release entitled "Electric Rates Announced", both of which press releases were delivered to complainants by defendants and authenticated under the stipulation dated August 14, 1937.

"Mr. S. D. L. Jackson: And in reference to these two exhibits, I might add that exhibit 113, which has been received in evidence, the First Annual Report of the Tennessee Valley Authority, refers to each of these exhibits. I think one of them is quoted and the other one is referred to.

Mr. Fly: I think as a separate document, your Honor, it is not admissible. It is merely a declaration of policy.

It represents no concrete transaction. In fact, it was never translated into concrete transactions unless it can be urged that some of these specific transactions approved here were pursuant to it.

Judge Martin: What is the source of Exhibit 633, Mr. Jackson?

Mr. R. T. Jackson: It was given to the public as a press release, to the newspapers.

Judge Martin: Press release.

Mr. R. T. Jackson: Distributed publicly. On that subject I would like to be heard briefly before there is any adverse ruling on it, at least.

Judge Allen: Mr. Jackson, we have read the brief and considered it, and the Court, the whole Court has considered the brief carefully and discussed it. The Court adheres to its ruling.

Mr. R. T. Jackson: I take it that that carries with it also the implication that no further argument is desired at this time on that point.

Judge Allen: No further argument is necessary because we have very carefully considered your views expressed, not only at length, but excellently expressed. We have given it very careful consideration over a number of days. Exhibits 633 and 634 are excluded. They are excluded upon the ground that both of them are shown to constitute press [fol. 841] releases. It appears upon the face of exhibit 634 that that is a fact, and by the statement of counsel it is shown to be the fact with respect to exhibit No. 633.

Mr. R. T. Jackson: We not only concede but are anxious to show that they are press releases, and we want to show our friends advertised that. An exception please. I don't know that there is anything we could do in the situation, but would the Court regard it as impertinent for me to inquire whether the ruling is based upon the ground of incompetency or irrelevancy?

Judge Martin: Both.

Mr. R. T. Jackson: I assume that there is no contention that they are not properly authenticated.

Judge Martin: Oh no, no. That has been conceded throughout, repeatedly.

Judge Allen: Yes.

Mr. R. T. Jackson: So I am at a loss to know whether there could be anything other than irrelevancy. If there

was any question of competency I would want, if possible, to cure that. I cannot cure any question of relevancy.

Judge Allen: The Court accepts these exhibits as authentic. That is, that they are what they purport to be.

Mr. R. T. Jackson: Issued by the Tennessee Valley Authority.

Judge Allen: Issued by the Tennessee Valley Authority. The Court considers these exhibits incompetent, irrelevant and immaterial and you may have your exception.

Mr. S. D. L. Jackson: If the Court please I have a number more of press releases which I would like to have numbered, and the record may show that we offer each of them, and offer each of them separately in evidence, and I take it the Court will rule in conformity with its former ruling, and the record may show our exception separately to each one. They are all press releases.

(These press releases were numbered as Complainants' Exhibits 779-902 inclusive.)

Mr. R. T. Jackson: Yes. The one point I want to make really is this. I want the record to show we tendered to the Court each and every one of these press releases for examination, and that that ruling of irrelevancy is made pursuant to the examination of each document, at least to our tender of each document.

Judge Martin: If the record shows that, let the fact be what the record shows.

[fol. 842] Mr. R. T. Jackson: I want to be fair to the Court and I want to be fair to our client. My point is I don't understand that a document can be ruled out as irrelevant merely on the statement it was put up in a particular way but it would require an examination of each one. We do not insist upon the Court examining them.

Judge Martin: I don't agree with your expression. I think if the basis of the Court's ruling, that the press release is not admissible—we are dealing with actions, and not with statements made publicly, and I don't think that your argument is a logical sequence, since you have expressed that. The reason I am giving you my individual view is that if the record is to show that these documents have been inspected by the Court, the Court must inspect them.

Mr. R. T. Jackson: I don't know what the rule is.

Judge Allen: I may say that that was the purpose of the original ruling of the Court on this matter, and that I concur thoroughly in what Judge Martin has said, and also of course we must examine these if the record shows that we have examined them. This also must always be borne in mind, Mr. Jackson, in this case. The Court is ruling on competency, materiality and relevancy bearing in mind the issues of the case.

Mr. R. T. Jackson: I respect that. And the last thing I want to do is to cause this court any inconvenience or any additional work. On the other hand I have known of cases where it was held that the proper offer was not made because the material ruled out as irrelevant was not shown to the Court.

Judge Martin: That's all right, Mr. Jackson, but we want the record to show the fact.

Mr. R. T. Jackson: We tender them to the Court, is my point.

Mr. S. D. L. Jackson: If I may have the reporter place numbers on these I will be glad to hand them to the Court.

Mr. Fly: Let the record show a separate objection to each one.

Judge Martin: Just to save time, pass them up and we will pass them back to you.

(Documents handed to Court.)

Mr. S. D. L. Jackson: I have a selected group of 215 of these.

Judge Martin: You have exceeded our reading capacity in a half hour, I am sure."

Thereupon counsel for the complainants stated that they had marked those portions of the press releases which they [fols. 843-844] desired to offer in evidence in order that the Court might read them.

"Mr. S. D. L. Jackson: Complainants offer in evidence Exhibit 635. I might state this is an authenticated copy, under date of August 14, 1937, of a magazine article entitled "Tennessee Valley Looks to the Future". In exhibit 364 which was excluded by the Court, the excerpts that were excerpts from the hearing before the Interstate Commerce Commission of the House of Representatives were excluded, and in those excerpts that were offered there was a considerable amount of discussion which related to this

book, namely, that Mr. Meyer had been on the payroll of the TVA when he wrote it, and that they bought 60,000 copies for distribution.

Mr. Fitts: We object, irrelevant and immaterial, and an expression of an individual's views.

Judge Allen: Sustained.

Mr. S. D. L. Jackson: May we have our exception?

Judge Allen: You may."

STIPULATION RE STATEMENT BY MR. LILIENTHAL

Thereupon counsel for defendants stipulated that Mr. Lilienthal made the following statement on June 29, 1937, at the Hearings before the Subcommittee of the Committee on Agriculture and Forestry, U. S. Senate, 75th Congress, First Session:

"Mr. Lilienthal: The extent of the Authority's contracts for sales and the number of customers, summarized data of that kind, I should like the privilege of inserting at this point.

The Chairman: It may be inserted at this point:

"The Authority is now selling electricity to 17 municipalities with 14,900 customers, 11,394 of whom are residential, and 13 cooperative associations serving rural territory, with 13,250 customers of whom 10,908 are residential. In addition, it is serving 2,595 customers in rural areas directly, on a temporary basis, as well as 1,317 customers on Government reservations.

In addition to the foregoing, the Tennessee Valley Authority has signed contracts with a number of municipalities where service has not begun. A list of these, showing population and estimated power load follows:

	Population	Load (Kilowatts)
Alabama:		
Decatur	15,593	3,000
Russellville	3,146	1,100
Tennessee:		
Memphis	255,143	46,000
Knoxville	105,802	25,000
Chattanooga	119,798	62,000

Industrial contracts and others, where service has not begun, are as follows:

	Load (Kilowatts)
Aluminum Co.	20,000
Volunteer Portland Cement Co.	2,000
U. S. Army, Sardis Dam.	8,000

Total revenue from these contracts where service has not begun is estimated at \$3,125,000 annually.

The total number of customers now served is 32,063 of whom 25,643 are residential. Approximately 35 per cent of the residential customers are on farms, 31 per cent are non-farm customers in rural areas, and 34 per cent are urban customers.'

OFFERS IN EVIDENCE

"Mr. S. D. L. Jackson: At this time, if the Court please, we desire to offer the depositions or certain depositions taken in Washington, D. C. in July of this year. I might state that they are the depositions of Michael W. Strauss, David Wolfsohn, A. T. Hobson and J. M. Carmody.

Each of those depositions, just as Colonel Hackett's deposition which we got to a day or two ago, I think are almost entirely identification of documents. And if our friends will [fol. 846] make a stipulation that the documents produced by each of the witnesses, their authenticity is accepted, I can shorten this matter by simply offering the authenticated documents as exhibits in the record as we have for Colonel Hackett.

Mr. Fly: We will agree to that."

Counsel for complainants offered in evidence as Complainants' Exhibits 637 to 643 inclusive, 645, and 646 press releases issued by the Public Works Administration, and as Complainants' Exhibit 644 a letter dated Nov. 8, 1933 to State Engineers from H. M. Waite of PWA. The offer was made as to each such exhibit separately.

"Mr. Fitts: We object to each separately and severally on the grounds stated heretofore.

Judge Allen: The objection is sustained separately and severally as to each offered exhibit.

Mr. S. D. L. Jackson: And may we have a separate and several exception?"

Counsel for complainants offered in evidence as Complainants' Exhibit 647 the compilation made by Mr. Wolfsohn of the power views of Franklin D. Roosevelt.

"Mr. Fitts: To which we object, incompetent, irrelevant and immaterial.

Judge Allen: Objection sustained.

Mr. S. D. L. Jackson: May we have an exception."

Counsel for complainants offered in evidence as Complainants' Exhibit 648 the press release dated May 13, 1935 of The Electric Home & Farm Authority Inc.

"Mr. Fitts: It is a press release. To which we object.

Judge Allen: Objection sustained.

Mr. S. D. L. Jackson: Exception."

[fol. 847] Counsel for complainants then offered in evidence and the Court received as Complainants' Exhibit 649 the contract, produced by the witness Hobson, between the TVA and the Electric Home & Farm Authority, Inc., the old company, which, the witness Hobson testified in his deposition, the TVA was still carrying out with the new company.

"Mr. S. D. L. Jackson: As Mr. Hobson testified in his deposition, they were carrying on under the same contract. But he produced from his files a contract, the first three pages of which apparently start out, 'Under a contract made effective as of the First Day of July 1934'. It has some slight modification of that contract. It is still a contract. What it is, it is really a supplemental contract between the Electric Home & Farm Authority, Inc. and the Tennessee Valley Authority. Mr. Hobson testified that was the contract under which the successor company was carrying on with the Tennessee Valley Authority. Now, with the exception of the first three pages this is similar to the contract dated July 1, 1934, which was received in evidence this morning. The first three pages of which are a part of Complainants' Exhibit 649, are now offered as bearing upon that contract received this morning.

Judge Allen: It may be received."

Counsel for complainants offered in evidence as Complainants' Exhibits 650, 651, and 652 circulars prepared and issued by the new Electric Home & Farm Authority, and as Complainants' Exhibits 653, 654 and 655 circulars prepared and issued by the original Electric Home & Farm Authority.

"Mr. Fitts: We object to each of them upon the ground they are immaterial.

Judge Allen: Objection sustained to all six exhibits.

Mr. S. D. L. Jackson: May we have separate exceptions as to each?

Judge Allen: You may."

[fol. 848] Counsel for complainants offered in evidence as Complainants' Exhibit 656 the document dated June 14, 1937 produced by the witness Hobson, which lists the territories in which EH & FA financing facilities are available.

"Mr. Fitts: We object to that upon the ground it is immaterial.

Judge Allen: Objection sustained.

Mr. S. D. L. Jackson: Exception."

[fol. 849] Thereupon counsel for defendants read testimony from the cross examination of the deposition of the witness Hobson, as follows:

By Mr. Fly:

"Q. In response to a question of Mr. Jackson, particularly relating to Complainants' Exhibit 649, I believe you stated that is the contract with the Tennessee Valley Authority? I believe you stated also that you carried on business in cooperation with the private utilities?

A. Yes."

"Mr. S. D. L. Jackson: If it please the Court, in lieu of reading any portion of the witness Wolfsohn's deposition we have agreed upon a statement that may be made to the Court, just this:

That David E. Lilienthal was a member of the National Power Policy Committee from the date of its formation some time early in the year 1934 until some time early in the year 1937.

Mr. Fitts: We concede that fact is true."

Counsel for complainants then offered in evidence as Complainants' Exhibits 657 to 681, inclusive, twenty-five separate letters and memoranda passing between the TVA and the EH & FA, Inc., the original company.

"Mr. Fitts: We object to each of those upon the ground it is incompetent, and also immaterial and irrelevant.

Judge Allen: The objection is sustained to each and every one of the 25.

Mr. S. D. L. Jackson: May we have a separate exception?"

Counsel for complainants offered in evidence as Complainants' Exhibit 682 the list, prepared by EH & FA, of the dealers as of June 30, 1937, from whom EH & FA had purchased conditional sales contracts on which TVA was collecting monthly installments for the account of EH & FA.

"Mr. Fitts: We object to that upon the ground it is immaterial.

Judge Allen: The objection is sustained.

[fol. 850] Mr. S. D. L. Jackson: Now, may we have an exception. Now, with respect to the exhibits identified in the deposition of Mr. John M. Carmody, perhaps I can reach an agreement. The witness Carmody produced construction loan contracts and amendments thereto for certain cooperative associations.

Judge Martin: Pardon me, Mr. Jackson, I don't want to interrupt your trend of thought, but isn't there already in the record virtually the same thing in connection with the testimony of Carmack for instance, about the Middle Tennessee Cooperative, and also the witness who testified about the Alabama cooperative down there? Isn't it practically cumulative testimony?

Mr. Fitts: Some of them are in. The Middle Tennessee is in, and I think North Georgia is in.

Mr. S. D. L. Jackson: Is it?

Mr. Fitts: Yes."

It was then conceded by counsel for defendants to be a fact that Mr. Carmody produced construction loan contracts between REA and the following cooperatives: Clarke-Washington Electric Membership Corporation, Cullman County Electric Membership Corporation, North Georgia Electric Membership Corporation, Monroe County Electric Power

Association, Meigs County Electric Membership Corporation, Duck River Electric Membership Corporation, the Middle Tennessee Electric Membership Corporation, Southwest Tennessee Electric Membership Corporation, Gibson County Electric Membership Corporation, and Cherokee County Electric Membership Corporation.

"Mr. Fitts: Of course, in entering into that agreement we do not wish to be understood as conceding that the contracts between REA and these cooperatives, or the relationship between REA and these cooperatives has any bearing on the legal question that is here involved. It is just admitted as a fact."

Counsel for complainants offered in evidence as Complainants' Exhibit 683 the press release dated August 7, 1936, prepared and issued by the Rural Electrification Administration.

"Mr. Fitts: To which we object upon the grounds previously stated. This is a press release which just discussed the work of REA on various projects.

[fol. 851] Judge Allen: The objection is sustained.

Mr. Jackson: Exception."

Counsel for complainants offered in evidence as Complainants' Exhibit 684 a copy of the letter dated July 2, 1935 to George W. Kahle of REA from Harry L. Brown, Director of the Home Economics Department, State of Georgia, dealing with the North Georgia Electric Membership Corporation.

"Mr. Fitts: To which we object for all of the reasons, plus the fact that is between parties who are not interested in this suit and have nothing to do with it, and it relates to the Georgia situation furthermore.

Judge Allen: The objection is sustained.

Mr. Jackson: Exception."

Counsel for complainants offered in evidence as Complainants' Exhibit 685 a copy of the letter dated April 28, 1936 from the North Georgia Electric Membership Corporation over the signature of R. C. Pittman, to the Rural Electrification Administration, Washington, D. C., and which accompanied a report.

"Mr. Fitts: We object to it upon all of the grounds stated.

Judge Allen: Objection sustained.

Mr. S. D. L. Jackson: May we have our exception? And may I have an exception separately to the exclusion of each of the exhibits which the Court has excluded?"

Counsel for complainants offered in evidence and the Court received as Complainants' Exhibit 116A a photostatic copy of the table on page 359 of the report on the Hearings before the Subcommittee of the Committee on Appropriations, House of Representatives, 1937, which is Complainants' Exhibit 116.

Counsel for complainants offered in evidence as Complainants' Exhibit 686 a certified copy of the message of the Governor of Tennessee to the Legislature of the State of Tennessee on January 22, 1935.

[fol. 852] "Mr. Fly: Objection, as irrelevant.

Judge Allen: The objection is sustained.

Mr. S. D. L. Jackson: May we have an exception?"

Counsel for complainants offered in evidence as Complainants' Exhibit 687 a certified copy of the message of the Governor of Tennessee to the Legislature of Tennessee on April 8, 1935.

"Mr. Fitts: The same objection.

Judge Allen: The objection is sustained.

Mr. Jackson: Exception."

Counsel for complainants offered in evidence and the Court received as Complainants' Exhibit 688 a certified copy of the certificate of incorporation issued by the State of Tennessee to the Middle Tennessee Electric Membership Corporation.

"Mr. S. D. L. Jackson: And may it be stipulated, Mr. Fly, that there are ten such electric membership corporations now organized in the state of Tennessee?"

Mr. Fly: Mr. Jackson, we can agree that there are similar charters for these associations which you will list here. It might be stated that Franklin County and Stone's River and Madison County and West Tennessee, as I understand it, have been merged with others of this same group, and are not operating independently.

Mr. S. D. L. Jackson: Subject to that statement Mr. Fly, may we enumerate here the ones that have had charters issued?

Mr. Fly: Yes.

Mr. S. D. L. Jackson: Charters have been issued to the Middle Tennessee Electric Membership Corporation, Franklin County Electric Membership Corporation, Stone's River Electric Membership Corporation, Gibson County Electric Membership Corporation, Madison County Electric Membership Corporation, West Tennessee Electric Membership Corporation, Southwest Tennessee Electric Membership Corporation, Bedford County Electric Membership Corporation, the name of which has been changed to Duck River Electric Membership Corporation, North Georgia Electric Membership Corporation, Lincoln County Electric Membership Corporation, Pickwick Electric Membership Corporation, Meigs County Electric Membership Corporation, and East Tennessee Electric Membership Corporation.

[fol. 853] Mr. Fly: That is correct. I don't think there will be any difficulty in the record as to which are in operation. The maps almost demonstrate that. At any rate, we can make it clear by the proof."

.

"Mr. S. D. L. Jackson: Now, at this time, if the Court please, we have certain excerpts from Exhibit K which was filed and made a part of the defendants' answer in this case that we want to introduce in evidence.

Mr. Fly: This is the record in the Ashwander case, I believe. I object to taking any extracts from the Ashwander record as evidence. I think that is going to the wrong place for it, your Honor. It is not the proper way to get it into the record. If we start that sort of thing I don't know where we will be going.

Mr. S. D. L. Jackson: I might say, if the Court please, here is the document that these gentlemen attached to and made a part of their answer. Now, certainly they cannot be heard to say before this Court, having put that document into this record, and the record in this case, that any portion of it that we desire to use cannot be used by us, and they are bound by the authenticity of the document. There just can't be any question about that.

Judge Martin: I see your point about estoppel on the part of the objector or adversary, but suppose that be conceded, still isn't it the function of the Court to pass upon the relevancy and the materiality and competency of a pleaded exhibit.

Judge Allen: And hasn't the Court made that exactly the ruling of which Judge Martin speaks with respect to the exhibits which were attached to the petition in this case, to the bill of complaint? The Court has repeatedly ruled that many of those exhibits were incompetent, irrelevant and immaterial.

Mr. Fly: Let me make clear, your Honor, the only purpose in attaching that was on the plea of *res adjudicata*, and that applied only to certain specific companies, and certainly has no application generally.

Judge Allen: What is the purpose of these minutes? Is this to get in certain discussions?

Mr. S. D. L. Jackson: No. Some of these extracts are here. They relate to the action of the Board of Directors with respect to public statements that should be made concerning the activities of the Authority. That is one. And perhaps we can save time if I may be permitted just to read these briefly. They are not long. TVA minutes of June 26, 1933.

[fol. 854] Judge Martin: We cannot intelligently rule on this without hearing at least what it is all about.

Mr. Fly: Yes, sir,

Judge Martin: If that is an authentic paper and the defendants admit that, could not we take it as an authentic paper? Then we could pass on its competency, materiality and relevancy.

Mr. Fly: I think it is probably accurate.

Judge Allen: The Court will permit Mr. Jackson to read it and we will rule on it.

Mr. S. D. L. Jackson: In this particular extract, of course, we are offering this from a part of the defendants' answer, offering for the Court's ruling:

'No employee of the Tennessee Valley Authority should make any statements affecting matters of future policies or activities, before such policies or activities have been brought before the Board and action taken.'

That is from the TVA minutes of June 26, 1933.

Mr. Fly: We further object on the ground it is irrelevant.

Mr. S. D. L. Jackson: The TVA minutes of August 25, 1933, relating to the same subject, top of page 533 and page 534—this is exhibit K—‘It was decided that all publicity should issue through the publicity department, and that special publicity dealing with special phases of the work should have the approval of the Board before issue.’

Mr. Fly: I object to that as irrelevant.

Judge Allen: Objection sustained, excluded. You may have your exception.

Mr. S. D. L. Jackson: We note our exception to each.

Judge Allen: The Court considers the statement immaterial.

Mr. S. D. L. Jackson: It is not excluded by reason of the source from which it is offered.

Judge Allen: It is excluded on the ground it is immaterial.

Mr. S. D. L. Jackson: Complainants offer in evidence from exhibit K, attached to defendants’ answer, the tables set out on page 419, being a Tennessee Valley Authority five year program, condensed statement. Does the Court care to see these?

[fol. 855] Mr. Fitts: We object to that on the ground it is immaterial, irrelevant and incompetent. It shows on its face it was a projected program for the future, and this record already shows what the present program is. That has been superseded by the unified plan of which these complainants have spoken so much, and it is apparent from the record already.

Judge Allen: Objection sustained.

Mr. S. D. L. Jackson: May we have an exception?

Judge Allen: You may.

Mr. S. D. L. Jackson: Complainants offer in evidence the extracts from the TVA minutes of July 11, 1933, appearing at pages 531 to 532 of exhibit K attached to defendants’ answer. Would the Court prefer for me to offer several of these at once? I expect to offer extracts from minutes of subsequent meetings which appear here. Would the Court prefer me to offer these separately?

Judge Allen: They do not embody resolutions, but embody discussions.

Mr. S. D. L. Jackson: Some of them embody each.

Mr. Fitts: They were the very minutes before the Supreme Court in the Ashwander case. This is the record, discussing plans, policies and programs by the Board.

Mr. S. D. L. Jackson: I will offer these separately.

Mr. Fly: I want again to make it clear, this Ashwander record was attached to our separate answer as to the Alabama Power Company, alone. It was not brought into the record in this case as to the other 17 complainants. It was on the plea of res adjudicata, separate answer to that company alone.

Judge Allen: This is the minutes of July 11, 1932?

Mr. S. D. L. Jackson: Yes, your Honor, that is what I now offer.

Judge Allen: Sustain the objection.

Mr. S. D. L. Jackson: May we have an exception?

Judge Allen: You may have an exception.

[fol. 856] Mr. S. D. L. Jackson: Complainants further offer in evidence the extract from the minutes of the meeting of the Board of Directors of the Tennessee Valley Authority of July 30, 1933, appearing at pages 532 and 533.

Mr. Fitts: To which we object upon the same grounds.

Mr. S. D. L. Jackson: Just a minute. I might say that the resolution which is shown there in the middle of page 533 is a resolution that you gentlemen furnished us, which is now in evidence.

Mr. Fitts: That is right. We left out the discussion.

Mr. S. D. L. Jackson: You left out all the other part of the minutes, whatever it is.

Judge Allen: Objection sustained. You may have your exception.

Mr. S. D. L. Jackson: Exception.

Judge Allen: How many more do you have?

Mr. S. D. L. Jackson: I have got about—I can shorten this a good deal. They are in similar meetings of October 16, and some in the meeting of December 16 are in. But, aside from that, I want to offer all the rest of the corporate minutes.

Judge Martin: Mr. Jackson, it is clear they are programs of their operations, discussions, all sui generis of that type which has previously been excluded by the Court. You want to preserve your record, is that correct?

Mr. S. D. L. Jackson: Not all of these. At that time they related to things the Authority was proposing to do, planned to do and policies they had adopted. And of course there is other evidence which shows those which have actually been carried out.

Mr. Fly: But, you have every minute reflecting the corporate action. These are discussions, considerations of the Board members.

Mr. S. D. L. Jackson: I cannot accept that; I have seen nothing except what you have turned over to me. I do not know that I have got everything.

Judge Martin: We are trying to admit words followed by action, put into effect by action. We have, therefore, admitted actions by the TVA but excluded discussions of programs about a lot which were not put into effect.

Mr. Fly: When we furnished you the resolutions we took [fol. 857] out the discussions.

Judge Allen: We will be here until midnight, gentlemen, unless we hurry along."

Counsel for complainants then separately offered in evidence as Complainants' Exhibits 700 to 721, inclusive, and 770 to 778, inclusive, each of the following excerpts from the corporate minutes, and certain other documents which appear in Exhibit K attached to defendants' answer:

Complainants' Exhibit 700, being a table entitled "Tennessee Valley Authority, 5-year program condensed statement," appearing on page 419 of Exhibit K;

Complainants' Exhibit 701, being an excerpt from the minutes of the meeting of the TVA Board of Directors dated June 26, 1933, appearing on page 531 of Exhibit K;

Complainants' Exhibit 702, being an excerpt from the minutes of the meeting of the TVA Board of Directors dated July 11, 1933, appearing on page 531 of Exhibit K;

Complainants' Exhibit 703, being an excerpt from the minutes of the meeting of the TVA Board of Directors dated July 30, 1933, appearing on page 532 of Exhibit K;

Complainants' Exhibit 704, being an excerpt from the minutes of the meeting of the TVA Board of Directors dated August 5, 1933, appearing on pages 533-534 of Exhibit K;

Complainants' Exhibit 705, being an excerpt from the minutes of the meeting of the TVA Board of Directors dated September 18, 1933, appearing on page 534 of Exhibit K;

Complainants' Exhibit 706, being an excerpt from the minutes of the meeting of the TVA Board of Directors dated September 21, 1933, appearing on page 535 of Exhibit K;

Complainants' Exhibit 707, being an excerpt from the minutes of the meeting of the TVA Board of Directors dated September 29, 1933, appearing on page 539 of Exhibit K;

Complainants' Exhibit 708, being an excerpt from the minutes of the meeting of the TVA Board of Directors dated October 13, 1933, appearing on pages 540 et seq. of Exhibit K;

Complainants' Exhibit 709, being an excerpt from the minutes of the meeting of the TVA Board of Directors dated October 14, 1933, appearing on pages 547-548 of Exhibit K;

Complainants' Exhibit 710, being an excerpt from the minutes of the meeting of the TVA Board of Directors dated October 24, 1933, appearing on pages 551-552 of Exhibit K; [fol. 858] Complainants' Exhibit 711, being an excerpt from the minutes of the meeting of the TVA Board of Directors dated October 24, 1933, appearing on pages 552 et seq. of Exhibit K;

Complainants' Exhibit 712, being an excerpt from the minutes of the meeting of the TVA Board of Directors dated November 27, 1933, appearing on pages 554-555 of Exhibit K;

Complainants' Exhibit 713, being an excerpt from the minutes of the meeting of the TVA Board of Directors dated December 16, 1933, appearing on page 557 of Exhibit K;

Complainants' Exhibit 714, being an excerpt from the minutes of the meeting of the TVA Board of Directors dated January 19, 1934, appearing on page 557 of Exhibit K;

Complainants' Exhibit 715, being an excerpt from the minutes of the meeting of the TVA Board of Directors dated March 30, 1934, appearing on pages 557 et seq. of Exhibit K;

Complainants' Exhibit 716, being an excerpt from the minutes of the meeting of the TVA Board of Directors dated April 13, 1934, appearing on pages 563-564 of Exhibit K;

Complainants' Exhibit 717, being an excerpt from the minutes of the meeting of the TVA Board of Directors dated June 30, 1934, appearing on pages 564 et seq. of Exhibit K;

Complainants' Exhibit 718, being an excerpt from the minutes of the meeting of the TVA Board of Directors dated July 17, 1934, appearing on pages 566 et seq. of Exhibit K;

Complainants' Exhibit 719, being an excerpt from the minutes of the meeting of the TVA Board of Directors

dated August 7, 1934, appearing on pages 570-571 of Exhibit K;

Complainants' Exhibit 720, being an excerpt from the minutes of the meeting of the TVA Board of Directors dated September 18, 1934, appearing on pages 571 et seq. of Exhibit K;

Complainants' Exhibit 721, being a copy of a letter dated May 10, 1934, from Arthur E. Morgan, Chairman of the TVA Board of Directors, to President Roosevelt, appearing on pages 575 et seq. of Exhibit K;

Complainants' Exhibit 770, being a synopsis of a letter from Henry T. Hunt of PWA, to David Lilienthal, and the letter in reply thereto from Mr. Lilienthal to Mr. Hunt dated November 22, 1934, appearing on page 661 of Exhibit K;

Complainants' Exhibit 771, being a telegram dated June 19, 1934, from Mayor Farr of Tuscumbia to David Lilienthal, appearing on pages 662-663 of Exhibit K;

Complainants' Exhibit 772, being a telegram dated June 20, 1934, from David Lilienthal to Mayor Farr, appearing on page 663 of Exhibit K;

[fol. 859] Complainants' Exhibit 773, being correspondence between PWA and TVA concerning a PWA allotment to Hartselle, Alabama, appearing on page 664 of Exhibit K;

Complainants' Exhibit 774, being a budgetary statement "Estimate of appropriations, fiscal year ending June 30, 1936" and the justification thereof, appearing on pages 664 et seq. of Exhibit K;

Complainants' Exhibit 775, being the answers of TVA to certain interrogatories concerning its corporate functions, appearing on page 669 of Exhibit K;

Complainants' Exhibit 776, being the stipulation concerning the testimony of Harold L. Ickes, appearing on pages 683-684 of Exhibit K;

Complainants' Exhibit 777, being the opinion of the PWA Electric Power Board of Review concerning Decatur, Alabama, appearing on pages 686 et seq. of Exhibit K;

Complainants' Exhibit 778, being the order of the Public Works Administrator establishing the Electric Power Board of Review, appearing on page 691 of Exhibit K;

"Mr. Fly: I think these extracts are objectionable on other grounds heretofore stated.

And, unless there be some misunderstanding about the status of the Ashwander record in this case I want to point

out to the Court it is attached only to the separate answer to the separate complainant Alabama Power Company, as to the plea of res adjudicata to that company, based upon its participation in that case, on page 310 of the record (of this case in the Circuit Court of Appeals)."

REQUESTS FOR SUBPŒNAS DUCES TECUM

Counsel for complainants then requested the Court to issue a subpoena duces tecum (marked for identification as Complainants' Exhibit 689) requiring defendants to produce documents and records showing the number of employees in the Department of Electricity as of October 1, 1937, the headquarters or offices of each of said employees as of that date, and the names of any additional employees in the Department of Electricity earning compensation at the rate of \$1500 per year or more who are now employed in that Department, other than those published in the annual report of the TVA for the fiscal year ending June 30, 1937.

"Judge Allen: The Court thinks that we might be able to supply that, the number of employees in the Department [fol. 860] of Electricity and consider the rest of the request rather immaterial, remote, and does not bear on the controversy. The Court will ask the Authority to find out and state in the record the number of employees.

Mr. Fly: We shall be glad to do that.

Mr. S. D. L. Jackson: May we also have their locations?

Mr. Fly: Why do you need the locations?

Mr. S. D. L. Jackson: To show you are spread out all over the country.

Mr. Fly: You have that in the annual report?

Judge Allen: The Court requests the Authority to give that information. Otherwise the application for this subpoena is refused in other particulars. You may have your exception.

Mr. S. D. L. Jackson: Very well."

Counsel for complainants then requested the Court to issue a subpoena duces tecum (marked for identification as Complainants' Exhibit 690) requiring defendants to produce a copy of the letter dated on or before October 15, 1934 from Mr. Lilienthal of the TVA to Mayor Overton of

Memphis, relating to the possible purchase by TVA of the steam plant of the Memphis Power & Light Company.

“Mr. Fly: It has never resulted in any action of any sort.

Mr. S. D. L. Jackson: If we are going to get into facts here as to what happened I will be glad to recite the circumstances under which I think this letter was sent.

Judge Allen: What are the facts?

Mr. S. D. L. Jackson: Of course the date is quite illuminating, October 15, 1934. I might state about September 19, 1934, TVA sent a letter to the officials of the City of Memphis, advising them in effect that the Memphis market was sufficient so that the TVA would construct a transmission line to Memphis within a short time. Then a short time later, at or about the 15th of October, 1934, they advised the city officials of Memphis that under certain circumstances, to-wit, if they began supplying the City of Memphis with power that they would be willing to consider the purchase of the steam plant of the Memphis Power & Light Company and use it for stand-by purposes.

[fol. 861] The election in the City of Memphis had been called shortly after the receipt of the letter of September 19th, and shortly before this letter which we are now subpoenaing and the election, I believe, was held in November 1934. Both these letters preceded the election a short time.

Mr. Fly: The director writes a letter to Mayor Overton. No transaction took place. It is not urged here any transaction took place.

Mr. S. D. L. Jackson: If there is any doubt about it, we will state it is our position in this case, of course, that the TVA has not any authority to buy the steam plant.

Mr. Fitts: Does that have any possible bearing on this case?

Mr. S. D. L. Jackson: I think it does, just before the election.

Mr. Fitts: Oh, it is the election you are interested in.

Mr. S. D. L. Jackson: That is one thing. I might state further, if the Court please, it is further our position that the TVA has not any right to build lines or own property, anything else over in Memphis. Those are the reasons we are asking for the subpoena.

Judge Allen: The application for leave to issue subpoena duces tecum as to this letter is denied. The Court feels that where no transaction has resulted, that correspondence

necessarily has no bearing on the immediate issues in this case.

• Mr. S. D. L. Jackson: May we have an exception to the Court's ruling?

Judge Allen: Yes."

Counsel for complainants then requested the Court to issue seven additional subpoenas duces tecum (marked for identification as Complainants' Exhibits 691 to 697, inclusive) requiring defendants to produce various documents in their possession.

"Mr. S. D. L. Jackson: Each of these subpoenas duces tecum is a breakdown, separating rather distinctly by subject matter documents which were described in our original subpoena duces tecum. I don't believe there is any new document there. These others which we had, there was some difficulty about.

[fol. 861a] Judge Martin: Mr. Jackson, you used virtually the same descriptive language with respect to each that you did in the Spreadeagle or broad subpoena?

Mr. S. D. L. Jackson: Yes.

Judge Martin: These are simply collating the pertinent subjects.

Mr. S. D. L. Jackson: Yes.

Judge Martin: Logically arranged.

[fol. 862] Mr. S. D. L. Jackson: If the Court will recall, in the original subpoena that we filed, we arranged a great mass of correspondence largely in chronological order, have broken all of that down and collated it by subjects.

Judge Martin: It is collated matter.

Mr. S. D. L. Jackson: It is collated matter. Each of those subpoenas relates to a rather narrow subject now.

Judge Allen: The Court has in its hands seven applications for subpoena duces tecum. The court denies each of these applications and you may have your exception severally and separately.

Mr. S. D. L. Jackson: May we have an exception, separate exception to the denial of each."

Counsel for complainants then offered in evidence the following excerpts from Complainants' Exhibit 365:

Beginning on p. 379 with the question of Mr. May, "I have a memorandum here", and extending to the end of the fine

print at the top of p. 380; the last question and answer on p. 380 and the first two questions and answers on p. 381.

The Court excluded the excerpts as such. Counsel for complainants excepted to the Court's ruling and without waiving the benefit of their exception had copied into the record for the attention of the Court as part of the whole document the excerpts excluded as excerpts.

"Mr. S. D. L. Jackson: May it be stipulated, Mr. Fly, that the Electric Home & Farm Authority, the District of Columbia Corporation, succeeded to all the property and all the rights and liabilities of the original Delaware Corporation, Electric Home & Farm Authority, Inc.?"

Mr. Fly: That is correct."

Counsel for complainants and defendants then argued the motion, renewed by complainants in accordance with the Court's ruling at the opening of the trial, to take the deposition of Harold L. Ikes.

[fold 863] RULINGS ON CERTAIN EVIDENCE, ETC.

"Judge Allen: The application for leave to take the deposition of Secretary Harold L. Ikes is denied. In addition to the reasons heretofore stated for refusing this application, the Court considers that the testimony proposed to be produced is irrelevant and immaterial to the issues presented herein under the law applicable to the case.

The Court excludes all exhibits offered from exhibit K, attached to the answer herein, (Tennessee Valley Authority vs. Ashwander, page 419, 2691, in the Record of the Circuit Court of Appeals of the Fifth Circuit,) with the exception of the letter from Dr. Arthur E. Morgan to President Roosevelt, dated May 10, 1934. This exhibit is admitted upon the ground that it constitutes a report from the Chairman of the TVA Board to the President. Complainants' Exhibit 701, dated June 26, 1933, is also admitted. Whatever of the proffered evidence in the other exhibits as may be relevant, the Court considers to be cumulative. The proffered evidence which is not cumulative in character the Court considers to be immaterial and irrelevant under the law applicable to this case.

The Court has examined and considered each and all of the press releases offered in evidence by the complainants. Complainants strenuously contend that these numerous items, exhibits 779 to 902 are relevant and material. Obviously, questions of relevancy and materiality cannot be considered and properly decided in vacuo. Certain classes of evidence may be relevant and material in one case, and totally irrelevant and immaterial in another case. Thus a decision which holds that press releases are competent and material upon the question of notice has no bearing whatever here, where notice is not an issue.

The Court has been more than liberal in the admission of doubtful evidence. We do not, however, consider that all facts pleaded and proven, will necessarily form the basis of proper findings of fact. Bearing in mind the decisions cited by complainants, we hold that these decisions do not establish materiality and relevancy of this proffered evidence under the issues of this case.

The matter embodied in the releases falls generally into three classes. Assuming its competency, it presents evidence (1) as to specific rates, (2) as to operations and activities of the TVA in the generation, transmission and sale of electric power, (3) as to statements of plans and programs of the directors of the Authority.

In so far as the releases embody evidence of rates they are inadmissible under the previous ruling of the Court. [fol. 864] The defendants do not controvert the fact that the TVA has actively promoted sales in territory served by complainants of electric power generated at these various dams, and has done all lawful acts necessary and incident to that purpose. The ultimate facts on this subject which might possibly be established by these press releases therefore require no further proof. Upon this phase of the case the releases are purely cumulative.

In so far as the releases embody statements of purpose, plans, program, pronouncement, desire and motive of the directors, they are irrelevant and immaterial. Exhibits 779 to 902 are therefore excluded.

Exhibit 721 is admitted upon the ground that it constitutes a report from the Chairman of the TVA Board to the President.

Complainants may have exceptions to all these various rulings.

Mr. S. D. L. Jackson: A separate exception to the exclusion of each of the exhibits.

Mr. Fly: If your Honor please, we offer Defendants' Exhibit 29, the resolution rescinding the so-called statement of the power policy.

Mr. S. D. L. Jackson: Complainants object to it for numerous reasons. In the first place it is a self-serving declaration.

Judge Allen: Do you make any objection upon the ground of authenticity?

Mr. S. D. L. Jackson: No.

Judge Allen: You are conceding the authenticity of this exhibit?

Mr. S. D. L. Jackson: I have in my hand what purports to be a certified copy. I do think, if the Court please, of course the resolution of the Board of Directors original adopting the power policy was never turned over to us. Dr. Morgan testified before Congress that it was so adopted. Consequently I do not feel like conceding too much as to what the defendants' records truly show, without an opportunity of examining the record myself. Yes, and we have no means of knowing that this is full and complete.

Mr. Fly: We will put someone on the stand.

Mr. S. D. L. Jackson: And as stated, it certainly can be nothing more than a self serving declaration.

[fols. 865-890] Mr. Fly: It is action by the Board of Directors.

Mr. S. D. L. Jackson: It is still self serving.

Mr. Fly: It does not make it inadmissible.

Judge Allen: Objection overruled. It will be received."

Counsel for complainants offered in evidence and the Court received as Complainants' Exhibits 698 and 699 two resolutions of the Board of Directors of TVA as follows:

Complainants' Exhibit 698, being a resolution dated August 21, 1936, concerning pool level elevations at Chickamauga Dam;

Complainants' Exhibit 699, being a resolution dated November 18, 1933, authorizing Mr. Lilienthal to continue cooperation with the manufacturers of electrical appliances.

Thereupon complainants rested.

[fol. 891] Evidence for the Defendants

COLONEL LEWIS H. WATKINS was called as a witness on behalf of the defendants and, having been first duly sworn, was examined and testified as follows:

Direct examination:

My name is Colonel Lewis H. Watkins, Corps of Engineers, United States Army. I am 55 years old and now reside in Washington, D. C. I am a commissioned officer in the Corps of Engineers of the United States Army, at present detailed on the War Department General Staff. My duties are chief of the Geographic Branch of the Military Intelligence Division. I am a graduate of the United States Military Academy in 1907; I graduated from the Army Engineers' School at Washington Barracks in 1913 and from the Army Field Engineers' School at Fort Leavenworth in 1916; from the Army War College in 1925, and from the Naval War College in 1926. I have had 30 years service in the Corps of Engineers.

I was in charge of the United States District Engineer's office at Chattanooga from 1926 until 1931, and also at Nashville, Tennessee and Florence, Alabama, in addition to my duties at Chattanooga. During that period I prepared the report on the survey of the Tennessee River printed in House Document 328.

In Chattanooga I had charge of the construction, operation and maintenance of the existing projects for navigation on both the Tennessee and the Cumberland Rivers. I had charge of the investigation and reports upon application for permits for power projects under the Federal Water Power Act in both the Tennessee and Cumberland Rivers. I had charge of the Wilson Dam project and of the survey of the Tennessee River and its tributaries leading up to House Document 328.

The Acts of Congress covering the survey of the Tennessee River and its tributaries were the Acts of September [fol. 892] 22, 1922, March 3, 1925, January 21, 1927, and May 15, 1928. The Chief of Engineers furnished me a copy of the Acts for compliance in carrying out the survey and issued similar instructions to the other District Engineers. In respect to the Act of 1928, all District Engineers and the Division Engineer were instructed to furnish data to the

President of the Mississippi River Commission for making his estimates and plans on the lower Mississippi. In response to those instructions I took charge of the survey of the Tennessee River which had been begun in 1922 and I submitted a partial report on the survey in December 1927 and a final and complete report on the survey in December 1928. This report contained a plan for guide in the development of the river, both present and future, and a project for the improvement of the main stream from its mouth to Knoxville. This report was approved by the Division Engineer and by the President of the Mississippi River Commission.

My report was approved by the Division Engineer and by the President of the Mississippi River Commission, except that they recommended that the improvement for the present be limited from the mouth to Chattanooga instead of all the way up. It was approved by the Rivers and Harbors Board and by the Chief of Engineers and forwarded by the Secretary of War to Congress.

"Mr. R. T. Jackson: Now may I move to strike all that the witness has just said stating what was done with reference to approval, because in the first place it is not exactly right, and then in the second place what are the facts, or the best evidence, is the document itself, which is before the Court, and which states just what those officers did by way of approval.

Judge Allen: The objection is overruled, Mr. Jackson. The Court bears in mind that the Court was very liberal in permitting questions that were asked of your expert witnesses and permitting answers that they made. The Court has tried to get light from those witnesses, and from time to time, if the Court overrules a technical objection it feels that it treated your witnesses in exactly the same way. [fol. 893] Mr. R. T. Jackson: May we have our exception, and in order that I might not——

Judge Allen: You may have your exception.

Mr. R. T. Jackson: —be misunderstood by the Court, let me say this, so far as I know all I have asked our experts about was to state their understanding of what certain projects were."

The Secretary of War approved the report and forwarded it to Congress on March 24, 1930. Congress adopted

the project in 1930 for the improvement of the river from its mouth to Knoxville.

I studied the Tennessee River system for five years and am familiar with the dams constructed and under construction by the TVA and the projects recommended in the report of March 31, 1936. From my studies of the Tennessee River during the survey, I am very familiar with the purposes governing the layout and design of each project and of the part that it plays in the improvement of the river as a whole. I have personally inspected the dams which have been constructed or are under construction now by the TVA. On September 17, 1937, I received orders from the Secretary of War to proceed to Knoxville on temporary duty, and with an Engineer of the TVA I inspected the Chickamauga project and the Guntersville project on September 19th, and the Wheeler project and the Pickwick Landing project on September 20th. Returning to Knoxville by airplane, I observed the sites of the Watts Bar and Coulter Shoals projects, and I inspected Norris Dam on the 21st.

I read the Unified Report to Congress of March 31, 1936, setting out the projects recommended by the TVA. The report gives a very clear explanation of the work being done and the purpose and design and operation of the various projects.

In my opinion, the projects set forth by the TVA in its unified report have a substantial advantage for navigation over the low dams set forth in the report in House Document 328, in four important respects. In the first place, [fol. 894] the low dams have 32 locks, while the high dams which cover the same area have only 7. There is considerable delay in passing through these locks so much so that boats travelling in the high dam system can travel at about 12 per cent higher speed than in the low dam system. In the second place, boats with the same power can travel much faster in deep water than in shallow water. The low dam system is much shallower throughout than the high dam system, and that is especially important in connection with the upper end of the pool. There are 32 of those in the low dam plan, whereas there are only 7 in the high dam plan. In none of the 32 have you the advantages of increased depth due to stream regulation, so that the 7 pools of the high dam system are more advantageous. Where the pool

is very shallow, as it becomes in the upper end of the pools, it greatly restricts or impedes the velocity there, so that I roughly estimate that boats in the high dam system can travel approximately 15 per cent faster than in the low dam system. If you combine this with the delay caused by the locks, we will find that the speed of the boats in the high dam system due to those two factors alone, that is, delay due to locks and the better speed due to the deeper water, you have the boats in the high dam system travelling about 27 per cent faster than in the low dams. That is very important when you consider the cost of transportation, because it means strictly that much greater saving in transportation.

In addition to those complaints in the low dam system, you have no flood control. During all high water periods the boats carrying commerce are delayed and two per cent of the time they are actually stopped. Furthermore, you require boats of more power and have six months of the year with appreciable velocities in the low dam system which has the effect of taking greater time and of destroying the dependability of the service. Boats can not keep their [fol. 895] schedule as they should, and are delayed. In addition to that, you have the great fluctuation in the stages at the terminals for loading and unloading, as much as 40 or 50 feet. That is with low dams as compared with the high. All the terminals are located on the water front where they are exposed to damage by flood, and not only the terminals but the properties and the cost of the terminals are much greater.

While in the high dam system, with effective flood control, the long pools are more or less like lakes, so that so far as velocities are concerned the only places where there is any velocity that will interfere at all is in the upper end of the pool, and with the increased stream flow you have greater depths, so that interference is not so great as in the narrow, crooked channel. In the low dam pools, without flood control, they do become handicaps to navigation, especially in the part where the channels are crooked and narrow in the upper end, with cross-currents, etc. There is an increase in these high stages for about 6 months of the year, and of course there are floods occurring throughout the year.

The flood control of the TVA's system and the greater ease of loading and unloading will materially reduce the cost of transportation over the low dam system and avoid flood damage.

As to whether in my opinion navigation would be more seriously handicapped by wind and wave action in the low dam pools or the high dam pools, I will say that when you have waves, you have winds, and so the two always go together. In the low dam system, especially in the upper ends, the channel is generally narrow and it is not as wide as the river itself—it is only a part of the river. It is crooked and the wind will blow it out of this channel, if it becomes large enough to create waves of any extent. It is my opinion that the winds will interfere with the movement of commerce in the low dam system much more than the waves in the high dam system. In my judgment the low dams do not have any advantage for navigation, as compared to the TVA's high dam projects.

[fol. 896] "Q. Please state if you know whether the Army Engineers have constructed and recommended high lift navigation and power dams as a substitution for other low lift dams on other inland waterways?

Mr. R. T. Jackson: I object to that question. An expert witness may qualify and express an opinion as to the subject before the Court, but he cannot go further and testify as to other projects. That is so on direct, while our rights are not limited as to cross examination. If we want to, we can cross examine about things of that character and take chances on what he says.

Judge Allen: He may answer.

Mr. R. T. Jackson: May we have an exception?

Judge Allen: You may have your exception.

Mr. R. T. Jackson: And I assume we will have ample opportunity to rebut whatever he says?

Judge Allen: The Court bears in mind that the good faith of the Authority has been challenged by the complainants. Overrule the objection. You may answer.

A. Yes, in general the Corps of Engineers is replacing the low dam systems with high dams, and in a number of those where the opportunity affords it, they are providing for power.

Mr. R. T. Jackson: I move to strike out the statement also on the ground the witness is not qualified to pass upon what the Corps of Engineers' policy is.

Judge Allen: Objection overruled. The answer may stand."

In my opinion, the waterway system as proposed to be developed by the TVA projects would give a high standard of efficiency for the purpose of commercial navigation. The low dam plan would in no way contribute to flood control on the Tennessee and the Mississippi. In fact, on the lower part of the Tennessee and Ohio and Mississippi, it would slightly increase the floods. In my opinion, the projects necessary for the most effective improvement of the main stream include the high dams on the main stream which the TVA is constructing and reservoirs on the major tributaries and surcharge storage on all the high dams. I am referring to the type of projects being constructed by the TVA on the main stream and on its tributaries.

[fol. 897] In my opinion the projects which are necessary for the most effective improvement of the tributaries for navigation and flood control are the same reservoirs which I have mentioned for the improvement of the main stream, and eventually when navigation demands it, a series of high dams covering the navigable portions of the tributaries. That includes the present dams constructed or under construction—that is, Norris and Hiwassee on the tributaries. The reservoir projects are storage dams, while high dams, like those on the Tennessee are for navigation. But we had provided surcharge storage on those also, and you would do the same thing on the tributaries, perhaps not so much.

The projects on the Tennessee River should be laid out for improving the river for navigation so that there is a continuous series of overlapping projects. Where there is a gap between projects, or where the overlap is not sufficient for navigation, it creates an obstruction to navigation which would require the construction of a low dam to carry navigation through there, and such low dams are expensive, in the first place, and as I have already explained, for the low dams of the Tennessee, they are not so satisfactory for navigation because of delays and interference.

The surcharge storage in the main stream dams is located on the dam throughout the length. It is close, therefore, to the point which you desire to provide protection for or re-

duce the flood. With it you are able to eliminate the peak of the flood all along the main stream, all the way down. It will also make more effective the storage held out by the reservoir projects on the head waters. In the third place, it makes it possible to assist materially in reducing the crest of the flow on the lower Ohio and also the Mississippi.

[fol. 898] Reservoirs on the tributaries of the Tennessee are needed for flood control on the Tennessee and Mississippi basins. The storage on the main stream is insufficient for effective flood control, even on the main stream itself, so that reservoirs on the tributaries are essential. The tributary reservoirs also have an effect on the effectiveness of the main stream reservoirs for flood purposes. The water that they hold out will make more effective the action of the storage on each of the high dams on the main stream, in eliminating the peak.

In my opinion, the provision of surcharge storage to be provided in the dams recommended by the TVA's Unified Reports would be preferable from the standpoint of flood control to the so-called valley storage in the natural river. The natural storage is uncontrolled. It simply goes down the river. While it does help to prevent the flood waters from increasing the floods so rapidly on the lower river, it is absolutely uncontrolled. On the other hand, the surcharge storage on the high dams, while if they were not so constructed, the high dams might increase floods below, by providing this it prevents that increase, and it proves a very effective means for the controlling of these flood waters.

In general, the sites for which the power companies applied for permits on the main stream of the Tennessee River did not provide for continuous overlapping pools sufficient for navigation on the river. In a number of cases they left gaps. For example, there would have been one at Pickwick Landing and another at Chattanooga. Some of their plans, although not applied for, provided for leaving in Widows Bar. In that connection I might state in general the power companies desired to pick out the most favorable site for a project, rather than to make the series continuous and overlapping. Furthermore, they did not desire to have them overlap at all, because they would cause a loss of head.

[fol. 899] "Q. Did any of those companies offer to provide reserve flood control storage?

Mr. R. T. Jackson: I object. The question is irrelevant and immaterial.

Judge Allen: He may answer.

Mr. R. T. Jackson: We take an exception.

A. Of the 41 projects for which 12 different power companies had applied for, and were awaiting action when the report was submitted, none of them provided for surcharge storage."

I think most of those 41 projects were submitted by the complainants. There was only one of those companies that applied for storage of appreciable quantity, of large capacity, and that company endeavored to have the storage of large capacity constructed by the Federal Government.

Cross-examination:

All these applications for projects by private companies on the Tennessee and its tributaries were for construction by their own funds. In none of these projects did they supply flood control. None of these companies, except one, provided for an appreciable storage. Some did not provide for any storage at all. Others that did not provide for it, except the one, asked for only a small amount of storage for their own local use. In other words, it was not storage to assist in the development of the resources of the river as a whole. It was just for local use.

Direction examination continued:

The Act adopted by Congress for the improvement of the main stream of the Tennessee River from its mouth to Knoxville provided for cooperation by the power companies with the Federal Government in carrying out those projects. I refer to the Rivers and Harbors Act of 1930, adopting the project for the improvement of the river and not to the TVA. [fol. 900] In this statute the power companies were required to take out an application under the Federal Water Power Act for the project. While some of them had applications covering parts of the river, no action was taken on it and the District Engineer and the Division Engineer took up the subject with all the power companies interested, and while they expressed a willingness to cooperate, they offered no effective means. That was the situation when the

TVA was passed. At the time the TVA Act was passed, none of the power companies had undertaken construction of any of these proposed projects.

In my opinion, it is reasonable to provide a slack water pool below the minimum draw-down level for navigation at the storage dams on the navigable tributaries. It is the only reasonable thing to do. My report on the survey provided for a maximum draw-down for all reservoir projects on the navigable portions of the tributaries, in order not only to provide for local navigation in the pool of the dam, and for passing loose logs through the pool of the dam, but also for prospective future development for carrying a 6 to a 9-foot waterway through the pool. The reservoir storage in the lower part of the dam is very small, and it does not produce much from the available storage, if you set a maximum draw-down. Most of the storage is in the upper part of the pool, so by prescribing a maximum draw-down you make it practicable to provide for navigation in the pool and at the same time provide for storage from the reservoir proper. By that means you have both navigation and you have storage.

Examination by the Court:

When you build a reservoir project and collect storage in it, the water comes up to or near the top. Then, when you draw the water out for increasing the flow below, that lowers the elevation of the water in the dam down to a point for a [fol. 901] maximum draw-down. That is what the object in prescribing maximum draw-down is, to prevent it from being drawn all the way down and making navigation impractical. Draw-down is simply drawing off water in the pool. Minimum draw-down level is the same thing as maximum draw-down. The idea is the extent to which you can draw it without interfering with the navigation program.

Direct examination continued:

The so-called dead storage, so called by Mr. Kurtz, referring to the Norris Reservoir, provides the navigation that I have just mentioned. It is very useful for that purpose. In my opinion, the fluctuations in levels resulting from the operation of Norris Dam would not constitute a serious impediment to the use of the channel above the dam for navigation purposes, for the simple reason that the fluctuations in the elevation of the pool are very slow and

gradual throughout the year. Whereas, you take fluctuations in the main stream with the low dam system, they rise and fall very rapidly. In the pool of the dam you could very readily provide facilities for extending down a little further each day, and each day and each day. You would not have to change this position throughout the whole day. You simply move the facilities so that you could unload or unload on the lower depths, whereas on the main stream, without flood control, those variations in height would vary greatly throughout and seriously interfere with the loading and unloading.

On the non-navigable streams, the lower part of the storage of the reservoir is not very valuable for reservoir storage. On the other hand some provision should be made for silt to prevent it from interfering with your operations. I examined all dams and their pools in the basin when I was in charge of the survey and it was observed from those [fol. 902] examinations that the upper ends of the pools were filling up, and gradually filling up down toward the dam, up to a height below the maximum draw-down, about equal to the old, former channel, so that this space on the non-navigable tributaries where you did not even need to prevent it being drawn down for navigation, it can be utilized, and I think it should be set aside for that purpose, in other words not attempt to pull the reservoirs all the way down, unless there is urgent need for it. That would be true of both the reservoir types on the navigable and non-navigable streams. On the navigable type you must prescribe a maximum draw-down for navigation. In the non-navigable type it is useful to keep that lower part of the reservoir which is not of much value for storage purposes, for collecting silt and preventing it from interfering with the project. That storage would be useful for silt purposes on the navigable tributary portion also.

In my opinion, there is a serious difficulty in operating a flood reservoir by keeping it empty in advance of floods and emptying it after each. That is the normal operation for a flood control reservoir, where it is desired to obtain flood protection immediately below the dam. However, in a stream like that on the Tennessee River and its tributaries, where such reservoirs are operated on the head-waters, the release of that flood control water immediately after the flood endangers floods on the lower river, so that you do

have difficulty in releasing it without injury below the dam.

In a system like the Tennessee which is some 600 miles long, and with the additional length down the Ohio and Mississippi, your reservoir storage on the headwaters should be operated so that they will collect flood waters during the season of major floods on the Tennessee and Mississippi, which extends from about the middle of December [fol. 903] to the middle of May. And they should be released during the low flow season when there is no danger of increasing the floods below. This provides the only reliable means of providing flood control for the lower Tennessee and for further flood control on the lower Ohio and Mississippi. It is then feasible to release the flood waters collected during this flood season, during low water season to build up navigable depths below. It can be utilized then for increasing the low stream flow for the benefit of navigation and other uses—the conservation of power.

“Q. Will you state what method of operation in your opinion should be adopted for the Authority’s main stream dams?

Mr. R. T. Jackson: Well, I object to that question. There is no showing that what this witness says will make any difference. They have not provided any method of operation.

Mr. Fitts: We expect to.

Mr. R. T. Jackson: It seems to be a little out of order.

Judge Allen: The objection is overruled.

Mr. R. T. Jackson: You mean you are just going to make the plans in the course of the trial, are you?

Judge Allen: The objection is overruled.

Mr. R. T. Jackson: Exception.

A. The surcharge storage on each of the dams along the main stream should be utilized to eliminate the peak of the flood as it comes down, and make more effective the reservoir storage. For that purpose it should be lowered so that it will be ready to take care of and eliminate the peak as it arrives, and should be emptied afterwards so that it can catch the next peak which comes along. Now in this case I explained how reservoir storage endangers floods. In this case they are distributed all along the stream where they did effectively eliminate it without endangering the river below.”

[fol. 904] With the long series of projects and the flood gates in each and the surcharge storage in each, you have very effective control over the flow of waters throughout the length of the main stream, so that it is practicable to let out the water ahead of a peak, if it were not already drawn down, and without failure utilize the storage on the Tennessee to assist in reducing the crest of the flood on the lower Ohio and lower Mississippi.

In my opinion, the projects set forth in the TVA's Unified Report of March 1936 comply with the standards which I recommended as most effective for the development of the Tennessee River and its tributaries for the combined purposes of improving the navigation on the Tennessee River and controlling the destructive floods in the Tennessee and Mississippi River valleys. These projects and the method of operation outlined in the report are consistent with the development of a substantial amount of firm power. Having held out the water during the season of major floods, it can be utilized for increasing the low flow for the benefit both of navigation and for developing firm power.

Reservoir projects on the tributaries such as Norris and Hiwassee, and surcharge storage on all main stream projects play an important part in the most effective improvement of the Tennessee River and its tributaries for navigation and flood control, and further flood control of the lower Mississippi. They are essential for that purpose, in order to assist in the control of floods, not only on the main stream, but also to assist in reduction of floods on the lower Ohio and Mississippi.

Reservoir projects on tributaries such as Norris and Hiwassee, and the surcharge storage on the main stream dams will provide a substantial increase in the navigable depth of the main stream of the Tennessee before the dams [fol. 905] in the main stream of the Tennessee are completed. They will materially increase the navigable depth in the upper part of the main stream and on the Mississippi, that will be of substantial benefit to navigation. Such tributary reservoirs and surcharge storage will materially increase the navigable depth in the upper end of the pools of the high dams after they are constructed. This is the critical part of the pool in any canalized river improvement, and a little increase there does make a substantial benefit to navigation.

In my opinion, such reservoir, and surcharge storage will provide very effective flood control on the Tennessee River and its tributaries. And more or less effective flood control on the tributaries, and in some cases, the report indicated that the storage capacity of the reservoirs was not great enough to completely reduce all floods on tributaries, but in general they did.

"Mr. R. T. Jackson: As a matter of information, will you state whether you are referring to all reservoirs in the TVA Unified Plan or in the 1930 report?

The Witness: I am referring to the reservoirs on the tributaries as indicated by counsel's question.

Mr. R. T. Jackson: Which is it, the report of 1928, or the TVA Report?

The Witness: Those on the tributaries, the TVA are constructing those projects.

Mr. R. T. Jackson: Might I have definite information whether the Colonel refers to the reservoirs on the tributaries included in his report of 1928 or the TVA Unified Plan.

The Witness: Answering your question, the TVA projects are not enough yet to bring about the protection throughout the whole stream. I mean complete protection.

Mr. R. T. Jackson: Your reference is to the 1928 report?

Mr. Fly: Oh, let us not go into so much detail as to what his statement is based upon.

Judge Allen: You may proceed. The Colonel has answered."

[fol. 906] I did not mean to testify that Norris and Hiwassee would provide complete flood protection on the Tennessee, but I say that type of project is the very type that is necessary for it. It is my testimony that they will afford a substantial control of flood protection. From my studies in the report of the flood survey on the Tennessee River, especially when Norris Dam alone is constructed, I know that they will make a very substantial reduction in flood heights throughout the length of the main stream. Norris and Hiwassee reservoirs and the surcharge storage should materially assist in the reduction of the flood crest on the lower Ohio and the Mississippi. The function of the surcharge storage being erected on each of the dams along the main stream is to eliminate the crest of the flood as it goes

down stream and make more effective the storage held up by reservoirs on the tributaries.

I have examined and considered the proposed system of detention basins, as outlined in the testimony in this case of Mr. Kurtz. In my opinion, Mr. Kurtz' system would provide for local flood control immediately below the dams only. It would not provide reliable flood control on the lower Tennessee and on the Mississippi, and it would not even provide the most effective flood control for Chattanooga. In that connection I may say that a detention reservoir that is placed on the site of a valuable reservoir like that of Norris or Hiwassee precludes its use for storage reservoirs necessary for the development of the resources of the waterway for the benefit of navigation, flood control and other public beneficial uses. Those useful and desirable storage sites are very limited in number, and if we utilize them for detention reservoirs, it does not provide effective flood control for the river and further flood control on the lower Ohio and Mississippi, and we will not be able to secure the necessary reservoir storage for that purpose.

[fol. 907] In order that we may secure and develop the resources of the river and its tributaries to their maximum usefulness, it is essential that we control the floods and regulate the flow of the stream. For this purpose it is essential that we have the reservoir sites and that they be developed for reservoir projects instead of detention reservoirs. If so developed, as Mr. Kurtz recommended, they would greatly interfere with the development of the resources. In the second place, if we build low dams on the main stream, as advocated by the claimants, we would prevent the use of dams on that stream for flood control on the main stream itself, and for further flood control on the Tennessee and the lower Mississippi. The two combined would practically eliminate the bringing about of anything like the full development of the resources of the waterway and the great benefits which may be derived therefrom.

I had personal charge of the study of the Tennessee River. I personally laid out, designed and proposed a method of construction and operation of all the projects shown in House Document 328. With the assistance of a large number of good engineers I personally laid out and proposed the design and the proposed method of operation of each project. Those projects shown in my report on the Tennes-

see River were not primarily power projects. They were primarily for navigation and flood control, as I was specifically directed in the Acts of Congress governing the survey.

"Mr. R. T. Jackson: I move to strike out he was specifically directed in the Acts of Congress. It speaks for itself.

The Witness: Those were the instructions that I was carrying out.

Judge Allen: The objection is overruled.

Mr. R. T. Jackson: Exception noted, please."

[fol. 908] The projects now being constructed by the TVA are substantially the same as those recommended in the report on the survey. The report of the survey did not make detailed core borings for the various sites. We did not have the funds, so the lay-out was tentative, and it was contemplated that when they were actually built, detailed core borings would be made, and that project still would be laid out and designed to meet the situation when they were built. Now, the TVA has gone ahead and made the detailed investigations, and they have gone ahead and constructed the dams as it was contemplated would be done. After having studied and personally inspected the work being done by the TVA it is my opinion that the layout, design and general method of operation now proposed for the projects of the TVA conform to the best engineering methods of securing substantial navigation improvement and flood control.

The chart, (offered in evidence as Defendants' Exhibit 30), shows the information collected on the commerce on the inland waterways of the United States from 1919 to 1934. I requested the Chief of Engineers for data on the inland waterways of the United States. I explained the information I desired, and he had this information compiled by the statistics section of the River and Harbor Board, and furnished me for this purpose. It is based on data contained in the annual reports of the Chief of Engineers, which are public documents. In my opinion, this chart is an accurate representation of the information that it purports to convey. It is compiled by our most reliable source for furnishing information of this kind.

"Mr. Fly: We offer this chart in evidence as defendants' exhibit No. 30.

Mr. R. T. Jackson: We object to it upon the ground it is

outside of the scope of any issues in this case, the question of all inland waterway traffic in the United States.
 [fol. 909] Judge Allen: Objection overruled. The exhibit will be received. You may have your exception."

This chart shows that between the years 1919 and 1929, commerce on our inland waterways increased from about 148,000,000 tons to approximately 280,000,000 tons. In other words, within the ten-year period it had increased approximately 100 per cent. The same thing applies to the commerce on the Mississippi River and its tributaries. It increased during this same period from about 38,000,000 tons in 1919 to approximately 80,000,000 tons, an increase of over 100 per cent. While there was an appreciable drop during the years 1919 to 1932, due to the depression, commerce on our inland waterways again began to increase before the depression was over, and it is increasing now at a more rapid rate than it increased in the period 1919 to 1929. While due to the depression the increase in commerce was set back about ten years, in 1932, in 1936 due to additional data which the Chief has given me, it had recovered already in the four year period about three years of this. Some people are under the impression that our waterways are declining and becoming disused. I think that this chart shows very clearly and very effectively that that is not the case. One reason that some people believe that it is falling into disuse, is due to the fact that they do not see a large number of packet boats on our waterways. They may see only a barge and a tow. They do not realize the load that that barge is carrying amounts to about the same load that you ordinarily see carried on 250 to 300 freight cars, or five to six freight trains of 50 cars each. By barge and tow, I mean a towboat and eight barges.

This applies particularly to the requirements of modern industry for economical transportation of large volume and heavyweight freight. That is a common method of transporting heavy freight required in industry.

[fol. 910] At the time of the survey as reported in House Document 328, in spite of persistent demands by people of the Valley for the improvement of the Tennessee River for navigation, the navigable depth on the Tennessee River from Knoxville to Chattanooga at the lowest controlling point during low water was about 1.3 feet; and between Chattanooga and Florence, about 1 foot; and on the lower

river about 4.5 feet. During the period, however, between January and June, better depths were available, about 3 feet on the section between Chattanooga and Knoxville, and about 3½ feet, I believe it is, between Chattanooga and Florence, and about 6 feet on the lower river. The river at that time was subject to fluctuations of floods of 40 to 50 feet or more. In spite of all these handicaps in our report on the survey, when submitted, there were about 2,000,000 tons of commerce carried on the river. There were 61 tow-boats, 183 barges with a total capacity of over 42,000 tons. There were numerous terminals throughout the length of the river, and there were arrangements for transfer from rail to water.

I made a very thorough commercial survey to determine the amount of commerce which may use the waterway and the amount which may be obtained for power and potential minerals, which may be developed if the development of the Tennessee River and its tributaries are developed as indicated in my report. It was sufficient to determine beyond a reasonable doubt the economic feasibility for the development for navigation.

In the first study which I made, I made a study of the statistics of the basin, including the products of agriculture, forestry, manufacturing and minerals; the population, the wealth, the tonnage and the power entering into the manufacture of various products. I made a study of the coal, mineral products in the basin. I sent out questionnaires to [fol. 911] chambers of commerce and manufacturing interests, water transportation companies and utility companies, and so forth, who I considered would be interested in the matter. This study was not completed. However, from this incompleting study, it was estimated that at least three million tons would utilize the waterways, based on the statistics for 1926, and as those were projected into the future on the rate of increase of power,—on increase on our inland waterways, this would have amounted to 16,000,000 tons by 1950. This study was not completed for the simple fact that I desired to secure an estimate based on fundamental facts, to get down to the real facts of the case, and determine beyond a reasonable doubt the practicability of the commerce utilizing the waterway. So I adopted a method which would show this beyond a reasonable doubt.

In this method I decided to determine the amount of com-

merce which was actually travelling across the basin, within the basin, to and from it and across it; take that commerce, tabulate the origin, from whence it came, where it went to, and make a study, determine its cost by rail and determine the possibility of transporting it on the water, either by direct water transportation or by rail and water combined, and from that determine whether or not it would be possible for the commerce to be transported on the waterway more economically than on the existing transportation facilities. It was also contemplated that I would make a study of the prospective increase due to increase resulting from increase in industrial developments. I also planned to take the commerce which is indicated by the 1926 traffic and extend it into the future by the indicated increase in railway commerce during the past preceding ten years, to determine what would be the commerce which could economically utilize the waterway from 1940 to 1950.

At the time I made the survey on the Tennessee River, I [fol. 912] was also making a preliminary examination for the improvement of the Cumberland River and its tributaries in a similar manner to that of the Tennessee River. For both surveys, I sent an engineer from the Nashville district to the headquarters of the railways which are transporting freight in this region, at Louisville, Cincinnati and Washington. Through the courteous consent of the railway authorities I examined every bill of lading, and every shipment of freight to and from, and across the basin, tabulated those, segregated them to agricultural products, forestry products, mineral products and manufactured products, and we noted also the actual point that each shipment was from.

It covered practically the whole of the year 1926, except in a few instances where there was one or two months we did not quite complete, and we extended the estimate of that. We eliminated at that point all shipments of articles of a class that we did not believe would utilize the waterway. From the results obtained, it was found there was 27,000,000 tons of commerce transported within, to, from and across the basin of the Tennessee River for 1926.

In the final report submitted, and a supplemental report published in House Document 328, it was estimated that approximately 9,000,000 tons of this total could have been transported more economically on the waterway than on

the railway, and that this would have resulted in a saving of approximately \$12,000,000 in the cost. The average saving was about \$1.31 a ton. The comparison of savings in cost to costs on railroads was approximately 30 per cent. The calculated saving on traffic from the mouth of the river to Chattanooga only was approximately over 3,000,000 tons and approximately \$5,000,000 per annum. This indicated that approximately one-third of the commerce transported within, to, from and across the basin could have [fol. 913] been transported more economically by water than by rail, which indicates beyond a reasonable doubt that the waterway would, if constructed, play a very important part in the economic transportation of freight, not only in the southeastern part of the United States, but in the entire Mississippi Valley basin, because a great deal of that commerce was transported through the mouth of the Tennessee River into the Ohio, and to points on the Mississippi and other parts of the Mississippi basin. It is realized that due to the fact that existing manufacturing plants are already provided with rail transportation, and have the switches right up to the plant, and are not readily located for shipment by water, and due to the fact that terminals would have to be constructed, and that transportation companies would have to be organized for shipping commerce, like those now on the waterways of Germany, it is realized that these benefits could not or would not be obtained as soon as the waterway was constructed.

In order to obtain a conservative estimate, it was decided to take 60 per cent of the amount which the 1926 traffic estimated could be transported more economically. Taking 60 per cent of that indicated as that which could be transported economically, and adding to it the approximately 2,000,000 tons already on the waterway, we would have for the 1926 traffic about 7,700,000 tons per annum, with an annual savings in the cost of transportation of approximately \$10,000,000 per annum. By increasing that amount by the ratio of increase of rail commerce, we would have for 1950 about 17,700,000 tons, and approximately \$23,000,000 per annum in savings. On the tributaries we would have had in addition thereto, if and when they are developed, approximately 6,000,000 tons for 1926 and about \$7,000,000 per annum [fol. 914] savings, and approximately 16,000,000 tons for 1950 and about \$17,000,000 per annum savings. That is in

addition to that on the main stream, and of course assumes that six to nine foot navigation would be provided on the tributaries. That is something which we may consider for future development.

It was contemplated, when I decided on a method which would get down to the fundamental facts of the case, and establish beyond a reasonable doubt,—after having completed the study on the commerce that was actually going to, from and across the basin, that I would make a very thorough study to determine the probable estimated increase in industrial development which would be brought about by the much more economical transportation of commerce by the waterway and by the abundant amount of power, both of which enter into the manufacturing problem, but it became so very self-evident that there was no question of the economy of the waterway that I had to determine, that I did not fully complete that. I did collect enough information to indicate undoubtedly that the cheap transportation furnished by the waterway and the abundant power would bring about a great increase in the industrial development.

I collected for that purpose, in addition to data which I have already mentioned, the products of manufacture, agriculture, forest and minerals, and the tonnage which entered into manufacture, and power which entered into the manufacture of various products and the actual factories and plants which were existing at that time, a mineral survey of the map showing where all of the minerals which were then being developed were, and the reserves and the location of plants, and so forth. It was intended to continue that, and show just to what extent the waterway would assist in assembling the raw materials, and in distributing it to the consumers.

[fol. 915] “Q. Can you give a reasonable estimate of the increase in commerce which may result from the increased industrial development?”

Mr. R. T. Jackson: I object to that.

A. Yes.

Mr. R. T. Jackson: Pardon me. I object to that question as altogether too speculative. He has now disclosed that

he made a speculative answer about increasing commerce, speculative answer about increasing mining and industrial activities. While I have heard of five year plans, it seems to me a plan that goes 25 or 30 years into the future is altogether too speculative.

Judge Allen: The objection is overruled. The Court understands that it is the witness' opinion.

Mr. B. T. Jackson: Note an exception. I think it has gone too far.

A. As I have already stated the studies were carried far enough to indicate beyond a reasonable doubt that it would play an important part in our industrial development. Now, that being the case, I have a good example of the increase which could be expected by industrial development by making a study of the increase in our waterway transportation of the United States; and also in the power, the two elements that go into and help to bring about an industrial development. That is very clearly shown on the charts that the Chief Engineer furnished me, because a great part of the commerce carried on our waterways are iron ore and coal and forest products and petroleum, and those very things which went into it. So they do undoubtedly bring about a very good estimate of the increase."

It is an estimate, but I think it is a very good, reasonable one. It is the best estimate that I think that any one can make. These charts show that the rate of increase of commerce on our inland waterways through recent years, when we were turning more and more to industry, is approximately 100 per cent in 10 years. The same thing applies to [fol. 916] power, so that instead of increasing the estimates of the commerce which could economically utilize the waterway in 1926 by 2.31, as I did in my former estimates, we would increase this by 3.4 per cent. That would be a big increase over what I have already given. I should not have said 3.4 per cent, but that you may multiply the 1926 figures by 3.4 to obtain the 1950 estimates.

The curves which I have already shown indicated that the depression following 1929 set back the increase of commerce on our waterways about 10 years between the period of 1929 and 1932. However, between 1932 and 1936, including data that I got from the Chief of Engineers for this purpose, in that short four-year period it had made

back 3 years of the 10 years set-back, so that this indicates that by 1950 the estimates which I have already given would be approximately correct. In other words, it would have made up the set-back caused by the depression.

The ratio of the average savings for all products to the present cost of transportation, using rail rates as the measure of cost, was about 30 per cent. Of course, in some cases, the same article, the saving would be much less because it was not so favorable, the points between which it was shipped was not so favorable, so that it varied even for the same item, but taking them all, I struck an average which was about 30 per cent.

The common practice in the Corps of Engineers in determining the amount of expenditure which should be made for navigation alone is to determine, first, the savings in the cost of transportation which would probably be brought about by the waterway as compared to existing means of transportation, whether it is railway or waterway, or what. This estimate takes into consideration the expenditures for loading and unloading, and also the terminal charges. If they are not actually in the rates, we put in the cost of loading. We balance that against the annual charges for [fol. 917] the cost of construction, operating and maintaining the waterways. These fixed charges include interest on the cost invested in the project. It varies somewhat from period to period on account of the changes in the rates that you expect. We generally use a figure like 4 per cent for that, and I always added to that $\frac{1}{2}$ of 1 per cent for liquidating or amortizing the investment making, say $4\frac{1}{2}$ per cent. In addition to that we add to the fixed charges the cost which experience has shown would be necessary to cover what is normally covered by depreciation and replacement of equipment, and the maintenance and operation, plus dredging and everything else in the vicinity of the project. That is added to the interest and amortization. Based upon this method of analysis, the expenditure which would be justified in my opinion for navigation alone on the main stream of the Tennessee River, based on the 1926 traffic, would be approximately \$200,000,000, and based on the 1950 traffic approximately \$500,000,000. Where we are making the waterway for not only navigation but also navigation and flood control in combination with the development of power and other public beneficial uses, it

would not be necessary, of course, to expend that amount for navigation alone.

In my opinion, it is reasonable to expect a greater volume of traffic on the Tennessee River due to the TVA's high dam plan of navigation rather than the low dam plan. On account of the greater speeds that a boat could make, and due to the lack of delays caused by dams and by interruptions, undependable service of the low dams, etc., unquestionably you would be able to secure a greater increase in commerce on the waterway than that which I have stated in the report, for the simple reason that the estimates used in the report were based upon those obtained by actual experience on low dam waterways, and upon open river waterway river sections.

[fol. 918] "Q. Based on your studies in connection with the survey, please state what benefits would result from flood control on the Tennessee River and its tributaries.

A. You mean for communities, and navigation purposes?

Mr. R. T. Jackson: I object to the question unless it specifies whether it is referring to the projects included in the TVA unified plan, or to the vast number of projects which this witness says he considered in his 328 report.

Q. Well, it refers, Colonel—let's take up the tangible property losses. What is your estimate of the loss of property on the Tennessee River and its tributaries due to floods?

A. My estimate indicated that with effective flood control the actual savings of property loss, placed on an annual basis, would have been approximately one million six hundred thousand dollars or seven hundred thousand dollars per annum. As I recall now—

Mr. R. T. Jackson: Just a moment. I object to this. I think he was going—I move to strike out that answer. The question asked him for flood damages, as I understood it. I think we are entitled to have the question specific as to whether he has been asked for his estimate based upon the projects included in the TVA Unified Plan, or whether he is making an estimate based upon these same hundreds of odd projects which he studied and set forth in his report, House Document 328, because manifestly it does not mean anything unless we know which it is.

Judge Allen: The objection is overruled. You may have your exception.

Mr. R. T. Jackson: Please note our exception.

Q. The answer is \$1,780,000 per annum?

A. Yes. I might add that also indicates what would be the average annual flood damage, the same thing practically."

That is the damage, or savings in damage, to property alone. It does not take into consideration the losses due to death and disease and unsanitary conditions, and the loss of their homes during considerable periods of time due to the floods, to interruption of commerce for long periods of time, having the railroads flooded and bridges washed [fol. 919] out, and all that kind of thing, or effects. That is purely property damage and did not take into consideration the decrease of property values in areas exposed to floods or the discouragement of industrial growth or population increase.

In my opinion, each of the dams constructed, under construction, or recommended for construction by the TVA constitutes the most effective means of improving navigation upon the Tennessee River, controlling destructive flood waters in the Tennessee Valley and for further flood control in the Mississippi Valley. The studies which I made for the betterment of the river indicate that they are. If I were instructed to create a minimum navigable channel of 9 feet on the Tennessee River and to control destructive floods in the Tennessee and Mississippi River Valleys by means of the construction of dams upon the Tennessee River and its tributaries, I would build substantially the same dams as those now being carried out by the TVA on the main stream and on the tributaries. From my very thorough study, made during the survey, I am convinced that all of these purposes could not be accomplished by any other type of dam.

[fol. 920] Cross-examination:

"Q. Colonel, I gather from your last two or few answers that nobody ever mentioned water power to you while you were engaged in the preparations for testimony in this case, but limited it to flood control and navigation?

A. Well, you see in the order which I got from a higher authority—and I happen to be in the Army and they are obeyed,—I was instructed to make a survey of the Tennessee

River and its tributaries for the most effective development of navigation, flood control, in combination with power and its other beneficial uses. So naturally I carried it out."

The power was mentioned by someone somewhere along the line and I included that in my survey. There was no desire to waste the resources of the waterway.

I am now connected with the general staff of the Army. My duty is that I am in charge of the geographic branch, Military Intelligence. It is a little more than a map room. It is the same duty I was performing last summer when I testified for the Government at Roanoke. I am not now acting in a special employment from TVA and I have no connection with TVA whatsoever.

There were 41 applications by private power companies for power development on the Tennessee River and its tributaries which were pending during my term of duty in this district. With one possible exception, where they were trying to get the money from the Federal Government, none of these power projects provided any surcharge storage, that is, storage over and above that which they would not operate, so that it would not increase the flood below. They failed to provide flood control over and above that which they would normally operate, in order to cut out the floods below. In my opinion, if operated for power plants, they would have been beneficial to control floods below to a certain extent, but not reliable, for at times, instead of reducing floods, they would have been fully operated as normally done by power companies, not only as normally done but as they must be to secure the most economical returns from their investment. They would at times not only have not reduced the floods but increased the floods below the project. They provided no dependable flood control.

Most of these projects did not have reservoirs of some kind. Some did have reservoirs and one, I think, had a large amount of storage. Not all of these projects provided storage. They were all for power purposes. Some of them did provide storage. In those cases where there was provided power storage, in accordance with the usual custom there was some proposed maximum draw-down level. They all did indicate, I think, the extent to which they contemplated utilizing the reservoir practically for storage, indicated by their useful storage.

"Q. Well, Colonel, you have had sufficient familiarity with power reservoirs to know that ordinarily there is a line designated as the maximum draw-down line, is that not true?

A. Yes, I am very familiar with that. Now,—

Q. All right—

A. (Continuing.) —the point is the power companies normally are not fixed at that elevation. If an emergency arises where it does make it desirable to draw down further during a very dry year, they not only could but they would, and must draw down lower than that in order to get the most economical returns from their investment. And that is why it is necessary for those who are looking after the interest of navigation to absolutely prescribe and fix the draw-down limit, beyond which it will not be drawn for the purposes of power.

Mr. R. T. Jackson: I move to strike out all but the first sentence of the answer.

Judge Allen: Motion overruled.

Mr. R. T. Jackson: Exception noted. I will say this—

Judge Allen: You may have your exception, and this witness will be permitted to explain his answers, just as the other witnesses have.

[fol. 922] Mr. R. T. Jackson: I have no objection to his explaining his answers. The only thing is I would like to get his answer and get on.

Q. Now, Colonel, is it true that the maximum draw-down in a pure power project is determined in general by the economic point to which the head may be feasibly reduced?

A. The power projects, when they submit their application for it, they submit a plan for the utilization of that project for power. Now, they indicate on that the amount which they desire to use for storage. Now, it may be possible at times, like some cases which I have known, that that storage is—and would be used for the purpose of carrying heavy peak loads by that project, if operated with a steam plant, which would greatly interfere with a large project's power. And possibly at times if they were operated by large steam companies, this storage would be utilized as a regulating storage by means of which they could regulate the power, and meet the actual commercial demands without any relation whatever to the needs of regulation of stream flow below.

Q. Well, Colonel, I am glad to have your advice on all these subjects. I ask you again if you know, and if you do not know, will you please say you do not know, whether, as a matter of engineering, the maximum draw-down level of a pure power reservoir is determined as a question of economics, having relation to the point to which it will not be economical to reduce your head and thereby reduce your power? Is there any relationship like that or not, or do you know?

A. Naturally, there is a relation like that. Certainly there is a relation, and I will explain a little bit more. I am here to tell the truth, the whole truth, and nothing but the truth. When you take up a question of that kind and ask the question, I desire you and the Court to know exactly the situation.

Mr. R. T. Jackson: I protest to the Court, I am entitled to an answer to my question.

Judge Allen: He had answered.

Mr. R. T. Jackson: I have got an answer now, plus a speech, which is the first one in fifteen minutes.

Judge Martin: I do not think the witness is subject to that criticism.

Judge Allen: I think the witness is trying to answer the question. It is the most unusual thing in the world for a man or a woman on the witness stand, I do not care how expert they are, directly to answer a question yes or no. It is the usual thing to start an explanation, and the witness is entitled to make his explanation. He has, in this case, answered your question.

Mr. R. T. Jackson: Yes, the only thing is I do not want to be charged with a great number of questions I have to ask to get an answer."

In a pure power reservoir you also have above the maximum draw-down level, a part of the storage reservoir which [fol. 923] represents the live storage used for power, and the top of that is ordinarily designated as the normal pool level. It happens, however, in my report or survey I use the term, the normal pool elevation for the maximum draw-down. In operations for power that part of the reservoir between the normal pool level and the maximum draw-down is ordinarily filled up during the high water season and released during the low water season. It will ordi-

narily be kept as nearly to the top of the normal pool level as the water conditions and other conditions affecting the operation will permit, and the difficulty in the situation is that it does fill at times and would be full at times of maximum, major floods.

"Q. Now, then, at that time if a flood comes along when this reservoir is up to its maximum or normal pool level, and there has been no flood control dam provided above that, will the result be that the flood will be augmented below the dam?

A. Yes, that is true, if it is operated and full at the time the major flood comes along, and is operated with a fixed crest, and you would have no surcharge on it—

Q. Yes.

A. As the Tennessee Valley Authority is constructing, it would not increase flood conditions below."

It accelerates the passing of the flood waters through the pool of the dam and it causes the flood waters below to bank up higher and increase their height. It makes the floods concentrate more quickly below and makes them higher, and the reason is that under those conditions there has been destroyed a certain volume of valley storage.

"Q. And hence the result is if you have a dam which produces power, it will not furnish any dependable flood protection unless it has surcharge capacity over and above its normal pool level for power purposes, which exceeds the amount of valley storage which will be destroyed by the reservoir when filled in each flood, is that right?

A. Now, your question is one of those questions I cannot answer yes or no. For the simple reason that you have not made it specific enough for me to say yes or no. In the first place—

Mr. R. T. Jackson: Let me make it more specific, if there is any doubt about it.

The Witness: All right.

[fol. 924] Q. Assuming you have a reservoir constructed to operate a generating power plant, and that the reservoir is up to its normal or maximum level for power purposes; is it not true that that reservoir under those conditions will not reduce floods below, unless it has a surcharge capacity

over and above the top of the power storage, which exceeds the volume of valley storage destroyed by the reservoir up to the top of the power storage?

A. That depends upon the manner of operation of the project, and also upon whether or not—if there is a lone reservoir upon the system, or whether or not it is one in a great long system of projects, like those on the main stream.”

Assuming a reservoir project with power storage to be alone and not related to any other project, and that the reservoir was full to the maximum pool level for power operation, as to whether there would be any flood control provided by that reservoir under those circumstances unless there were built above the power pool a surcharge flood capacity exceeding the valley storage destroyed by the power reservoir, if it is alone, where it is not related to other projects, and if it does not have sufficient flood storage—it depends upon the amount of the flood storage that it has got. The amount of the flood storage is the controlling factor in there.

If it had none, it would increase floods below. If it had an appreciable amount there, enough to balance or hold back an amount equal to that which it had before, yes, it would prevent flood increase, increase in the height of the flood below.

“Q. Well, it would just be a stand-off, would it not, if the surcharge equalled the valley storage displaced?

A. Depending upon the amount, and method of operation too, don't forget that.

Q. I have assumed, Colonel, that the power reservoir is full.

[fol. 925] A. All right.

Q. If that is true.

A. Yes.

Q. Would it not also be true, if the amount of flood surcharge provided above the power pool were exactly equal to the valley storage displaced, there would be a stand-off, and no effect below?

A. And there would be a stand-off if it were less than that at times.

Q. Why is that?

A. For the simple reason that if there were no surcharge

pondage or reserve flood storage, it would increase the floods below.

Q. Yes.

A. Now that is that, too, isn't it? If there were sufficient flood storage there to balance the amount it had increased it, that is, to hold back enough water to balance against the advance, then it would not increase it. Furthermore, if it were controlled, controlled with gates in the dam, you could utilize that to help to reduce the floods. So that it depends entirely upon the amount available as compared to the total displaced, and upon the method in which you would operate those gates."

If the reservoir were full to the top of the maximum pool level or power storage and no flood surcharge had been provided above, if you attempted to draw your water storage down for power purposes in advance of oncoming floods after the floods started, so that it was a component part of the floods, it would increase the floods if it were a lone project.

"A. But now you are not trying to apply that to the high dams on the main stream, are you?

Q. Don't worry about that Colonel, until we get to it.

A. Because if you do I can explain that also."

[fol. 926] Examination by the Court:

In so far as the dams on the main stream are concerned, the method of operation is to draw them down so that you obtain a sufficient amount of storage to effectively control the floods. In a series that water that is advanced below can be carried on down by the next dam below. They have a large project on the lower end of the river which is contemplated, Gilbertsville, which can readily prevent any increase in the floods, due to the surcharge pondage or due to the lack of a sufficient amount at the beginning of the floods. The proposed method of operation by TVA will be very effective in controlling the floods and eliminating the peak.

Cross-examination continued:

"Q. I intended, Colonel, to suggest to you a draw-down in advance of the peak, in an effort to create some storage space by the power storage?

A. Yes.

Q. You understood that, didn't you?

A. Yes. No, the way it was worded it could have been mixed up with the use of high dams on the main stream, and that is why I had to explain it. These engineering factors, if you are conversant with them, and understand them, and know them like I do, you have to know, you have to ask your question so it can't be misapplied. And I am not trying to delay by answering as I do. Now, if it were alone, absolutely alone, and there was no other project around it, and you tried to draw it down after the flood water started, so that that flood water was a component part of the flood, then it would increase the flood below, because if you draw it down and then try to catch it, the center of gravity of the waters which go down has been advanced, and it would increase the floods on the river below.

Q. Colonel, I am left a little confused. Now, I want in my question to assume——

A. Yes.

Q. That an attempt is made to empty the reservoir in part.

A. Yes.

[fol. 927] Q. In advance of the crest of the flood so as to leave some storage space which might be filled by flood waters. Now, taking this single reservoir, would that benefit, injure, or leave unaffected flood conditions down stream?

A. Yes; I think I have answered you before. If you had some reserve flood storage, or surcharge storage above, you may utilize that to balance and to offset the increase caused by drawing it down. If you had some; but if you had none, you could not.

Q. You understand I am not talking about flood surcharge at all, I am talking about drawing down the power reservoir?

A. Power reservoir itself.

Q. Yes.

A. Yes, that is what I am talking about.

Q. And that is the basis of your last answer?

A. Yes, that is if there is some reserve there, reserve there, not full when the flood came on.

Q. It was full, but you drew it down in prediction fashion as you said it might be done in your direct examination by the TVA?

A. You mean if the reservoir was full?

Q. The reservoir was full, to the normal pool level?

A. Yes.

Q. Had no flood surcharge, but you attempted to draw it down in advance of a flood which you had notice was coming down the river above.

A. I think I have answered that question about three or four times already."

I testified in the case of the United States of America v. Appalachian Electric Power Company on July 31, 1936 in the Federal Court for the Western District of Virginia about the Radford project, which was a power storage reservoir on the New River. In that case I was asked the following questions and made the following answers at Pages 2592 et sequi of the transcript:

"Q. Assume the Radford project constructed and filled up to its usable storage and a flood came down the river, what would have to happen there with respect to the operation of the project?

[fol. 928] A. If we assume that the Radford project be constructed as shown in the plan submitted by the applicant, and operated as described by their representative before the Power Commission of Virginia, the Radford project would increase the height of flood on the New River below the project and even down to and in the Kanawha, and into the Ohio, below the mouth of the Kanawha River.

Q. Would not these dams down below have some protection so far as flood conditions are concerned, I mean these government dams, wouldn't they break up floods or hold them back?

A. No.

Q. Why not?

A. For the simple reason that they cannot hold out the water to eliminate or alter the shape of the flood.

Q. Do I understand you to say if channel storage is filled by a pool which is more or less stationary, or intended to be as near stationary as possible, that the flood condition will be more serious under the conditions of that kind than if you did not have reservoirs in the river?

A. Yes. May I explain two situations?

Q. Yes, go ahead.

A. Ordinarily power companies operate their projects, even reservoir projects at as near what they call normal

pool elevation as possible. If a flood comes along they endeavor to maintain pool elevation up to normal pool height.

Another situation is that explained by a representative of the company during application for permit, that it may be drawn down as flood approaches, and then catch some storage later. In the first place, if they attempt to operate pools at normal fixed elevation, it will increase height flood immediately below.

Q. How is that?

A. For the simple reason that the river in its natural condition had to fill up its flood channel before the flood waters could pass through 21 mile length of the pool of the dam. When the dam is built the pool of the dam is already filled up, or has already filled up that portion of the channel except a very small portion in the upper end.

[fol. 929] Its flood gates in the dam have a capacity ready to discharge the water equal to that of the maximum possible flood. It can do that at any minute, as soon as the small portion in the upper end of the pool is filled up, which requires very little time, compared with that of filling up the entire 21 miles, the whole body of water within the pool of the dam is ready to move down just like a train pulling out of a station.

The rate at which it moves down will be that of the wave action of 20 to 40, to 60 miles an hour. It is hard for some people to see that, yet I know it is true, even considering that we include wave action and considering the fact that it takes only a short time to fill the rest of the flood channel in the upper end of the pool, when the whole mass of water in the pool is ready to move. That is very short.

Now, as I have already explained, if they are operating and must maintain that pool at that fixed elevation, when that water starts moving, they have got to open those gates, and let it down, if they don't, it will rise up and up and up, and overflow the dam. They must let it out.

Now the river is ready to discharge at the upper end just as fast as the water comes and the gates must let it out at the lower end, so the time of passage of flood through the pool or dam will be shorter after the dam was built than it was before the dam was built. Now if the time of passage is shorter, anyone should be able to understand that it has got to go higher.'

A. I would like to explain to the Court if I may, the

project he is talking about was located upon the New River how far above those navigation projects below? I think it was some—do you recall the distance?

Q. No. It was—

A. Some 200 miles, wasn't it?

Q. No, no, Colonel.

A. Well, 150.

Q. It was about 150 miles above London Pool?

A. Yes.

Q. And interspersed between that—

A. Yes, that is right.

Q. Just a moment. Interspersed between that, in your consideration, was the pool, the Bluestone Reservoir?

[fol. 930] A. Yes.

Q. Which was only about 40 miles below?

A. Yes, but that answer didn't say anything about Bluestone Reservoir.

As I was explaining to the Court, the Radford project, the project we were talking about, was located upon the New River about 150 miles above the series of navigation dams on the river below.

Furthermore, the navigation dams on the Kanawha River below, a series of them, had no surcharge pondage whatever, no reservoir storage with which to help to off-set for their own—not even that—and they would have slightly increased the flood. But they did not have surcharge pondage for eliminating the peak, as the TVA projects do. So there were two elements in that answer.

Q. Colonel, you overlooked the fact that the upper pool on the Kanawha River, London Pool, would have a surcharge of three feet, did you not?

A. No, it didn't have a surcharge of three feet. It had a pondage pool of three feet, however, for regulating power. It is an entirely different thing.

Q. It had it for regulating both artificial and natural changes of flow, didn't it?

A. It was not big enough to affect the natural flow by the amount that you could measure with a microscope."

I also testified in that same trial at the same time at Page 2596 of the transcript as follows:

"Q. Suppose in order to meet this storm they let the pool down or let the water out, what happens?

A. All right. In that case, if they drew down as the flood approaches, they could catch the same water at the peak and prevent the flood from being so high immediately below the dam, and it would be a benefit to the Radford project, but in advance of this flood, opening of gates to draw it down in advance, that quantity of water, much greater than it was even after the dam was built, they have advanced the center of gravity of the mass of the flood, with the result that as this bulk of water in the flood went downstream, was combined with waters flowing in from all of the lower tributaries, the height of the flood below would be not only that equal to the natural—may I change that? Caused by the natural disbursement of the natural flood channel of the [fol. 931] reservoir, also due to advancing the center of gravity of the body of the flood, it would, therefore, cause flood height on the lower river even greater than that of operating at normal pool elevation.’ ”

I would like to call attention to the fact that that was for the Radford project 150 miles above the series of the projects on the lower river, and that series had no surcharge pondage whatever, but they themselves would have slightly increased the height of floods below. I think I did use the words “slightly increased” in my testimony about the Radford project although I do not find it in the record of my testimony.

A single dam, if it destroys more valley storage than its flood surcharge, will increase rather than decrease the floods below that dam. It depends upon the amount of the flood storage which you have available and whether or not it will balance that advance which it would cause.

“Q. Now, Colonel, assuming that you have going down a stream a chain of dams, creating reservoirs which, in each instance, destroy more natural valley storage than they have flood surcharge under operating conditions, wouldn’t that chain of dams, unless aided by some other expedient also increase the flood damage, flood flow, flood heights at the end, the lower end of the chain of dams?

A. We have a wonderful example of that now laid out by the TVA.

Q. Well—

A. A very good example.

Q. I agree with you.

A. A very good example of the very question that you have asked.

May I explain now the effect of their proposed method of operation? Their proposed method of operation is to drawn down, if not already drawn down, the water in each of these chains of dams, so as to secure an amount of surcharge storage sufficient to very effectively handle the flood waters in the river, eliminating the peak. Now, they can very effectively do that for the simple reason that below each of the dams where there would be a banking and piling [fol. 931a] up of water there are flood gates in the next one below, and it can be very readily transported along without increasing the height of floods; and on the lower river, they have got the large Gilbertsville project which will prevent any advance in the floods down below, where they bank and pile up, say down on the lower end of the Tennessee below Gilbertsville, in the height. In other words, there would be no piling and banking up there.

Q. How you finished Colonel?

A. Yes.

Mr. R. T. Jackson: Now, Mr. Reporter, will you read my question, and please answer my question.

(Record read as follows:)

'Q. Now, Colonel, assuming that you have, going down a stream, a chain of dams creating reservoirs which in each instance destroy more natural valley storage than they have flood surcharge under operating conditions, wouldn't that chain of dams, unless aided by some other expedient, also increase the flood damage, flood flow, flood heights, at the end, the lower end of the chain of dams?'

A. Yes.

Mr. Fly: I think the witness answered that very question, may it please the Court. I don't see any reason for going over the same question six times in a row.

The witness has explained that an operation of drawing down in advance of the flood would make that space available and has shown just how the operation would be carried on.

Mr. R. T. Jackson: I am entitled, I think, to an answer.

Mr. Fly: Not to your answer, but his answer.

Mr. R. T. Jackson: He has refused to take mine. I have made no complaint about that.

Judge Allen: Can you answer that question yes or no?

The Witness: It would be impossible, your Honor, to set forth an explanation to the Court and make it very clear just what would be the effect. Now I said such a chain as that, of the Tennessee Valley Authority, because it is an excellent example, exactly fits in with his question as I understood it.

Judge Allen: Mr. Jackson didn't ask you about the Tennessee Valley chain.

[fol. 931b] Mr. R. T. Jackson: No.

The Witness: Yes. Very well then, let me eliminate what I have said there, if you will provide a chain of dams and operate them properly, to bring that about.

Q. Of course you have not answered my question, Colonel. I know you mean to.

[fol. 932] Q. My assumption is that you have a chain of dams going down the river, each one of which destroys more valley storage than it has flood surcharge under operating conditions upon which you answer this question, would the flood conditions at the dam farthest downstream be worse or better than if those dams were not there?

A. Well, now, you are still leaving me just where we were in a lot of these questions you have asked.

Q. I have assumed everything you have, Colonel.

A. Now wait a minute. Now, it depends on the amount that you have got there, and how you operate it.

Judge Allen: In other words, your answer is—

The Witness: You didn't give me—excuse me, your Honor.

Judge Allen: Well, let me ask you this. Your answer is that it could be operated so that floods would be increased, but that it could be operated so that the floods would be decreased.

The Witness: It depends, your Honor, upon the amount of flood storage, you see. In other words, he has not put that in, any time.

Judge Allen: Well, is your answer that you have to take the operations into consideration before you can answer that question?

The Witness: Yes, ma'am, your Honor, not only the operation, but the amount of storage. He has not given me

the amount either time, and that is why in order to answer it as quickly as possible I said 'For example, the TVA projects,' meets this—

Judge Allen: Now, tell me, Colonel, whether you can answer this question at all the way it has been asked?

Mr. R. T. Jackson: May I make this one suggestion, that the Colonel assume that I did assume that the valley storage destroyed is greater than the surcharge at each dam under the conditions.

Mr. Fly: May I inquire, do you assume that there will be no draw down?

Mr. R. T. Jackson: Absolutely, I am not talking about a draw down.

Judge Allen: Now can you answer the question?

[fol. 933] The Witness: I cannot answer it, your Honor, unless I know the amount of flood storage that has been displaced and the amount provided to regulate it.

Q. Suppose the amount of flood storage displaced, valley storage displaced, really, by those lakes is 10,000,000 acre feet, and that the amount of flood storage provided by the dams is 5,000,000 acre feet under operating conditions, if you will, to answer?

Judge Allen: Can you answer that?

The Witness: I think that I can give an answer that will be about right. Of course it is a theoretical thing and I have not actually sat down to run the operation and determine, but I did on my Tennessee River report run the factors of what would be the equivalent of that, downstream, and I think I can give a fairly good answer to it.

Judge Allen: All right, suppose you try it.

The Witness: All right. Now, under that condition, under that condition if properly operated, in order to control and draw down, which the question—

Q. That is not to be done; just what was not done, Colonel. You are trying to change the question submitted to you.

A. No, I am not. I am trying honestly to answer it.

Q. Please do not assume there is a draw down—I did not.

Mr. Fly: You are assuming there is no draw down?

A. Assuming there is no draw down, with this pondage? All right.

Judge Allen: There is no draw down in any dam.

Mr. R. T. Jackson: That is right, your Honor.

A. Well, if you get this 5,000,000 acre feet in surcharge pondage there, is that available?

Q. That is available in your whole string of dams, and they have destroyed 10,000,000 acre feet of valley storage.

A. All right. Very well. First, we will assume there are no reservoirs in the river above,—understand—there are no reservoirs in the river, and all we have is this series of projects there, they are wholly alone, not operating in a system. All right, in that case, what would happen is you can go ahead with the gates in the dams and with this pondage which is there, you can control the flow in here so that [fol. 934] the 5,000,000 acre feet available, can be assumed to be available to be utilized in eliminating the crest at the head. There would be a definite tendency for advancing and piling up of the flood, but this surcharge pondage there would be able to hold back an enormous amount and prevent such an increase."

If you have a flood of 20,000,000 acre feet going downstream in a period of six days and you still only have 5,000,000 acre feet of surcharge storage, you have still got to utilize that surcharge to help eliminate the peak all along the series. At the lower end while there will be a tendency due to utilizing the gates and getting the water down out of the way to keep from piling up along the stream, there would be a tendency to increase but the amount held back, if properly operated, which would probably balance it. It would probably entirely balance the tendency to increase so you would have along the series the advantages of flood control and you would have the value of those eliminating all the peak and in the control of the flood through there.

When you have utilized that 5,000,000 acre feet, you would not also have to shove out the 10,000,000 acre feet of valley storage at the lower end. The amount of water going down there at the peak would depend on whether you have reservoirs above and that is why I was going to answer that. I would like to explain that. You would hold it in reservoirs above and it would never get down. Let us stop and consider the thing for a while. You have the reservoirs above, you have these projects, you are bringing about an effective flood control along the river. With this flood control along

the river where is all this valley storage displaced? For example, uniformly in a ten day flood, there would not be 10,000,000 acre feet of valley storage displaced because the amount of valley storage would depend upon the height of the flood. If you lower the flood and effectively control it, [fol. 935] the amount of the valley storage that would be utilized would be enormously reduced and you might probably say it would not be in excess of the 5,000,000 acre feet of storage.

It is not the result of my answer that through my series of dams on the tributaries I would have caught the flood water before it got down to the chain of reservoirs on the main stream and therefore they would have been able to take care of the amount of flood water instead of the valley storage which has been displaced by the dams.

House Document 328 (Complainants' Exhibit 105) contains a table on Page 73 setting out the flood storage on the Tennessee River in the 1926 flood and in the maximum flood. The maximum flood shows the natural flood storage in the channel of 7,300,000 day second feet, which is 14,600,000 acre feet for the maximum estimated flood, which is one that is way up high and displaces a whole lot of valley storage. Those are the kind of floods that do the most damage. The next column shows the natural flood storage eliminated and shows 2,140,000 day second feet which means 4,280,000 acre feet. In the last column there is shown the amount of flood storage provided by 10-ft. surcharge which is 1,454,000 day second feet, or 2,908,000 acre feet. These figures are for the main river dams at Aurora Landing, Pickwick Landing Dam No. 2, Dam No. 3, Gunter'sville, Hales Bar, Chickamauga, White Creek, Marble Bluff and Coulter Shoals. For that flood my table shows that these dams would destroy a valley storage of somewhere around 1,500,000 or 2,000,000 acre feet in excess of the flood surcharge. But remember this project is one which brings about thorough flood control. These figures shown are the amount which would be displaced if you had this maximum high flood. According to that report that reduces it down to a flood height say of [fol. 936] only 20 feet at Chattanooga. Now where would this flood storage be displaced? Now, throughout my whole report I determined the amount of natural flood storage which was displaced and what could be done if you put in the controlled surcharge storage to compensate for that,

and use that as a measure at each project to provide and assist in the general system of flood control. That is why these figures were placed there. When it comes to the actual amount of flood storage eliminated, where you have effective flood control, it is very simple. I have finished.

The following paragraph 39 from House Document 328 at Page 71 correctly states my opinion:

"Regulation by natural flood storage of the flood channel—the flood channel of the Tennessee River between Knoxville and its mouth has in its present condition a capacity of approximately 14,600,000 acre-feet which is used by the river in its natural condition for the regulation of stream flow and the reduction of flood height. If a dam be built in the flood channel of the stream and gates are installed to maintain the pool of the dam at a fixed elevation in order to avoid overflowage, much less time will be required by the river to secure maximum discharge capacity through the pool of the dam because part of the flood storage capacity of the river channel is already filled. This will result in an increase in flood heights below the dam. The effect, therefore, of dams operated with a fixed pool elevation is to eliminate the flood storage capacity of the river channel and bring about an advance and increase in heights of floods below the dam."

Where the parties operate with fixed pool levels just like those applied for by the 41 power companies, it would have materially increased the floods at Chattanooga.

"Q. As a matter of fact, that applies to the 1926 flood, that paragraph, rather than the maximum, does it not?

A. Yes, applies to any flood.

Q. Specific figures would hardly deal with any flood?

A. Yes."

[fol. 937] Examination by the Court:

Whether normal floods last ten days to a month depends upon the part of the river. In the upper river, about Chattanooga, that would be a normal period for a flood. For effective flood control at Chattanooga or any point along the river you would want to control a sufficient amount of water so that the heights will not rise above a certain amount. It does matter what time you do that. You would want to do it at a time when the water in that dam reaches that height.

That is exactly what the surcharge in the main stream dam is for. You would watch the engineer's gauge and as the water reaches the height beyond which you do not want it to go, you will have this surcharge available and use it in catching all that water which comes along later. Then it holds it back and does not let it go by until the advance of the water has passed on and there is no danger of an increase below.

[fol. 938] Cross-examination continued:

In House Document 328 (Complainants' Exhibit 105) I have designated the maximum draw-down as normal pool level. In House Document 328 at Page 50, which is Table B, I have shown for instance the normal pool elevation of Cove Creek of 1050. As to whether that is the maximum draw-down, I had in mind at that time the fact that I had surcharge pondage on all projects and throughout my report it was my intention to utilize the normal pool elevation as that beyond which the project would not rise. It would be raised above that in order to provide the surcharge storage. The maximum draw-down is the lowest point to which the reservoir is drawn down.

In Vol. II of House Document 328 at Page 74 I have dealt with Norris Dam or Cove Creek Dam. The cross-section shows the low pool elevation at 930 and that apparently represents the maximum draw-down. The full pool elevation is shown at 1050. That is what I have listed in this table as normal pool elevation. Above that, however, you see surcharge storage in order to provide protection for local floods.

The report of the Hearings on the Second Deficiency Appropriation Bill of 1937 (Complainants' Exhibit 116) shows on Page 403 a column indicating the volume of the reservoirs under the heading "Tabulation of Principal Features of Present and Proposed Dams and Reservoir Projects of Tennessee Valley Authority". The total volume of reservoirs as shown there is 15,310,000 acre feet. Under the column headed "Controlled Storage" the total controlled storage is shown to be 8,731,000 acre feet.

[fol. 939] "Q. Now, will you tell me whether the difference between those two figures, amounting to some 6,700,000 acre feet, as I compute it, is not dead storage?

A. This is speaking of reservoirs here.

Q. As shown on that table, is not the difference between the volume of reservoirs and the volume of controlled storage, dead storage?

A. Yes.

Mr. Fly: May it please the Court, the witness has never seen this document before.

Judge Allen: He may answer. He may make his own answer.

The Witness: This is the first time I have ever seen the book. I do not know what is meant by the term 'controlled storage'. I always used the term 'useful storage', is that the same in this book."

The term, controlled storage, is applied to a great many different kinds of storage. For example, a very important factor in this case is the controlled storage which our surcharge holds along the main stream. That is an entirely different thing to useful storage in reservoirs. If the term "controlled storage" in this table is that which is normally used, which I used on this survey for "Useful Storage", the difference between the volume of the reservoirs and the volume of controlled storage is dead storage. That is it is dead storage according to the way you use it.

Whether or not of the difference in the TVA Unified Plan between the total capacity of the reservoirs and the dead storage, which amounts to some 7,600,000 acre feet, 4,365,000 acre feet is power storage, or storage which is drawn down for power purposes, is among the details of the TVA Unified Plan that I have not gone thoroughly into. I am [fol. 940] sure that the engineers of TVA who work with those figures can give you better detailed information than I can. I do say, however, that on account of my thorough knowledge which I gained during the survey of the Tennessee River, I am thoroughly familiar with the fundamental purposes for which each of these projects is laid out, designed and operated and the part that they play in the system. I think it would be better to have this detailed information of the projects which I have never studied before obtained from the engineers of the TVA.

"Q. Let us get this straight, Colonel, now am I right in understanding from your testimony just now, that you yesterday expressed an opinion upon the efficiency of the project in the TVA Unified Plan for flood control purposes,

without knowing the amount of dead storage in those projects, the volume of power storage in those projects, or the volume of surcharge for flood control, if any?

A. I have looked at the plans and studied them enough, I have read the proposed method of operation as shown in the 1936 report. I am so familiar, so thoroughly familiar with what various projects of certain quantities can do, that I can answer without hesitation as to the general effect they will have. Now, of course, to determine the exact effects, it will be necessary to do exactly what I did do on the survey, take all these figures set down and work them out carefully, taking into consideration the volume of the floods, the characteristics of the river, the type and layout of each dam and so forth, then I can give you an exact answer, but to try to utilize these figures which I have never seen, I do not know the reports, but I will be glad to give you the best estimate I can on it."

I know the way they propose to operate it from reading the report to Congress in 1936 of the TVA. I also know [fol. 941] what the various storages and elements in the system can do and how they may be operated. There are a number of ways you can operate them. I know their possibilities. I can give a reasonable estimate as to the effect of reservoirs without knowing how much dead storage, how much power storage or how much surcharge storage they have by a simple mental comparison with the system which I have worked out and with which I am very thoroughly familiar. I make a simple mental comparison between the system I have worked out and one that I do not know what it is by taking the projects which TVA is now constructing and seeing that they are substantially the same as those which I recommended in my report. Therefore, while there are changes and adjustments here and there, I can tell what the general effect is. I cannot give the exact figures.

"Q. Assuming that the total control flood storage in the TVA Unified Plan over and above the dead storage, and the power storage, is only a little over 3,000,000 acre feet, is that in accordance with the plan which you say you laid out in House Document No. 328?

A. Frankly I don't get the connection because I don't remember using that in my plan. If you can show me my own record, show me the place in my own data, and show me

theirs, I can look at it and perhaps give you a reasonable answer.

Q. I am assuming one figure and asking you whether that is in accordance with the figure in the plan that you personally worked out, and which I presume you know about. Now is it or not?

A. It has been ten years since I worked out those plans. And I came down here, before I came down here I was not given one minute of my official time to prepare for evidence, so that all of the evidence I had to prepare on was to read my own book, and it would be humanly impossible for a man to remember ten years a figure which has been compiled and worked out ten years ago. I haven't seen it.

[fol. 942] Q. I am not criticizing you at all, Colonel.

A. If you will please give me my record, my book, and show me the place in my book where that is, and show me the place in the report, I can answer it.

Q. I don't think there is anything like that in your report, Colonel. I am just asking you whether you knew.

A. Yes. Well now, will you show them to me, and I will be glad to compare them.

Q. Well, you have got as much information about that today as when you gave your direct testimony yesterday haven't you?

A. My testimony yesterday was based upon fundamental principles, and practices, and by looking over their plan and the project and seeing where they had put in dams that I had put in, which are substantially the same, and from my most thorough knowledge of the control and the effects which that would have on flood control, and increasing stream flow, I answered on those."

I provided a 10 ft. surcharge on my main stream high dams. As to whether it is a fact that the surcharge at Chickamauga Dam is 2 feet in the TVA Unified Plan, I have not gone through the whole details. The 1936 report gave 5 feet surcharge along these projects.

"Judge Allen: Do you know whether the surcharge is two feet at Chickamauga? If you don't know, say so.

The Witness: No, I don't know."

I do not know whether the surcharge at Guntersville in accordance with the drawings in the report of March 31,

1936 is one foot. As I recall the 1936 report it gave 5 feet surcharge with a draw-down in the operation of an additional five feet when they needed to assist in flood control.

My testimony about the effect of storage reservoirs giving complete and effective control on Tennessee River floods was not based upon approximately the 150 projects included in my report in House Document 328. It was not based upon the development of the entire system. When I was drawing up the general plan for determining what project was [fol. 943] to be undertaken by the Federal Government, I considered those projects and reservoirs essential for flood control and for the development that should be constructed in combination with the high dams on the main stream. The reservoir projects needed in connection with the high dams and the storage project on the main stream consisted of the major important reservoir storage projects on the major tributaries, very much like that which TVA is now constructing. My study showed very clearly that approximately the total results obtained for flood control could be secured by that system, not quite, but approximately, so it was my idea in recommending for adoption to Congress the project for the main stream with the high dams that the power companies would come in and develop these reservoir projects on the major tributaries which would soon bring about effective flood control.

"Q. Is your testimony that some plan would give complete and effective flood control on the Mississippi River and its tributaries, based upon the projects in the TVA Unified Plan alone, or is it based upon the projects set out in your report 328?

A. No, a study of the various reports and plans for flood control of the Mississippi shows quite clearly that for that plan a system of levees is required in order to prevent overflow of the channel."

All the projects which TVA is now constructing and those indicated in its reports will not give complete control and I believe I stated in one of my answers that in order to obtain effective flood control we should construct on all the major tributaries above Chattanooga the important storage projects. They would together give effective flood control with the high dams on the main stream. It would not be so great as the results indicated in my report but it would

attain practically that effect. All of the projects that I included in House Document 328 on the Tennessee River [fol. 944] and its tributaries I estimated would cost something over \$1,200,000,000. A great number of those projects do not play a very important part in the flood control system as a whole. The key projects, that is, the major reservoir projects, and those on the main stream are the vitally important projects and the others help.

“Q. In House Document 328, reading from paragraph 42, page 71, the paragraph is entitled ‘Reduction of flood heights by storage reservoirs and surcharge pondage’. It says,—I direct your attention to the statement—‘In order to determine the reduction of flood heights which may be secured by storage reservoirs and surcharge pondage, the effect which such projects would have on flood heights on the main stream have been traced downstream from the source of the main stream to its mouth for 10-foot surcharge on Tennessee projects, and for certain reservoir projects for the 1926 flood. For this purpose seven cases illustrating the effects which these projects would have had during the 1926 flood were determined as follows’. And I take only case seven, because the others are not material. Case seven ‘Effect of high dams at Chickamauga Dam, Dam No. 3 and Aurora Landing, assuming reservoir full at the beginning of flood, and normal pool elevation maintained’. And that, you will note, is three dams in a chain.

A. Yes.

Q. And then I direct your attention to the effect on flood stages table 1926, case seven, at the bottom, and ask you whether or not you did not there find that under such circumstances the natural flood height at Johnsonville would be increased 19½ feet. There is the figure right there (indicating).

Judge Allen: So that the Court may understand, where is Johnsonville?

Mr. R. T. Jackson: If I may inform the Court, I am told that it is 98 miles above the mouth, Johnsonville.

Judge Allen: Thank you.

A. Case seven, effect of high dams at Chickamauga, Dam No. 3, that is Joe Wheeler Dam, and Aurora Landing, which is now called Gilbertsville in the project, assuming reservoirs full at the beginning of flood, and normal

pool elevations maintained, the high dams which this referred to are high dams about 100 feet, I think it was, which I was required to make studies on in connection with the further flood control on the Mississippi, without any relation whatever to the system of projects recommended for the Tennessee Valley. And it is those dams to which he refers. They were absolutely recommended,—not recommended, and not approved—for the simple reason that they prevented the effective development of the resources of the river, and that recommendation was concurred in by the president of the Mississippi River Commission and by the River and Harbor Board, and by the Chief of Engineers, so that these projects which he refers to have nothing to do at all with the system that has been recommended for the development of the river.

Judge Allen: Now, you have made your explanation, Colonel, but what is your answer to the question?

The Witness: The answer is that it would have increased the head of that flood 19.5 feet. However, as I recall, I provided a large quantity of surcharge in those reservoirs which could have very effectively controlled the floods there, instead of increasing them."

All of the higher officers did not concur in this 328 report in recommending the low dam plan. In connection with the improvement of the river there was a system of projects of high dams along the main stream which were considered as the proper dams, and they were so recommended in the final report as it went up to the Chief of Engineers. In that it was contemplated that the government would cooperate with the power companies in actually constructing, I believe, the Joe Wheeler and Guntersville Dams and making core borings at all the other sites, but it was readily foreseen that such a project depended entirely upon the cooperation of the power companies. So, as the good people of the Valley had been trying to get navigation for 100 years, it was decided to adopt a plan which would assure the getting of the navigation by the Valley which they had so long been working for. For that reason we developed a practical method of bringing that about, at the same time doing everything we could to bring about the development of the high dams which [fol. 946] we saw was so desirable. In order to accomplish that purpose we decided to adopt the system of low dams

which gave one basis of justification of the Federal Government in participating in the development of the river, with the proviso that any two or more of those dams could be replaced by high dams to be constructed under the supervision of the Federal Water Power Act. If constructed before the low dams were constructed the Federal Government would pay towards the cost of that construction the amount of the cost of the low dams replaced. That seemed to be a practical method whereby we would give full opportunity for the power companies to come in and participate in the development. In case they did fail, we did have a project whereby we could bring navigation to Chattanooga without that.

Most of the flood damage which has occurred on the Tennessee River during the short past period of record of 50 to 100 years has been at and above Chattanooga. However, my report on the survey shows beyond a reasonable doubt that such floods as the 1000 year flood on the French Broad River and the Emory River are just as likely to occur in any other stream or part of the basin. So that as a matter of fact the probability curves indicate that possibly a larger flood could occur on some of the tributaries other than on the Emory and French Broad so that we cannot take the past short 50 year record as the basis for which we should provide for our flood control.

The estimate in my report to Congress showing that more than 90 per cent of the flood damages occurred at and above Chattanooga took into consideration probable floods which might occur in any tributary or any part of the main stream which is clearly and positively shown in the flood-frequency [fol. 947] curve for each and every tributary and the whole main stream of the river. Those are 500 year floods and any floods.

Most of the flood damage to urban property during the periods of record is confined to Chattanooga and above, but we have it in our records there where it did occur. I think the greatest damage to any one point was Chattanooga and I do know that there was very serious damage to property on the French Broad in those heavy floods. I also know that there was very heavy damage on the Emory River which occurred after the report had gone in and which, if you will look at the frequency curve in the report, predicted that very thing.

I know that the French Broad and the Emory Rivers are above Chattanooga. I did not find any flood protection for the Emory or the French Broad Rivers in the TVA Unified Plan. I do not recall seeing the project which their plan called for but they are carrying out the construction of reservoirs on the major tributaries above Chattanooga. They have gotten only so far at the present. I examined the TVA Unified Plan in its report to Congress of March 31, 1936, and found no flood control plans on the Emory or French Broad Rivers. Their projects have not yet reached the state where they have covered these important and major reservoirs on all tributaries, but they are carrying out the general purposes recommended.

I assumed that TVA in its Unified Plan submitted to Congress was just starting out on the original project. The report on the survey gives a general plan of developing the basin and of developing the flood control and TVA certainly is going ahead and doing just about what I would have done [fol. 948] if I were in charge of it. I did not assume that the TVA Unified Plan was just the beginning and I did not take into consideration the enlargement of that by reservoirs on all those upstream tributaries. I would not call it a beginning exactly because the projects which they have under consideration now will bring about a great effect in the reduction of floods. (After calling for and inspecting the TVA Report to Congress of March, 1936.) I do not find any TVA project on the Holston River.

I did not testify that I had given consideration to the flood control plan proposed by Mr. Kurtz and that it would not give as much flood protection at and above Chattanooga as the TVA Unified Plan. What I testified, if I am not mistaken, is that Mr. Kurtz' plan would not provide the most effective and most reliable flood control for the lower Tennessee. I did not compare it with the TVA Unified Plan.

As to whether I would not say that the Kurtz plan would provide a much higher degree of flood protection for Chattanooga in the case of any large flood than the TVA Unified Plan, if I were really working it out, I would take the figures and actually work it out and tell you. That I have not done, but I think I could give you an answer in some way.

I have not compared the two plans but I compared the layout and the general proposition. I know how they oper-

ate, what you can do with them, etc., and know the figures, about what the Kurtz plan called for and what he said, but I do not remember them now. I do not recall the figures of the relative amount of flood storage that would be provided in a large flood by the Kurtz system and by the TVA Unified system at and above Chattanooga. I looked the figures over but I do not recall whether the ratio is 10 to 1 in favor of the storage as provided by the Kurtz system. I would not say [fol. 949] that is not accurate. It is on record so you can look it up.

“Q. Now, Colonel, assume a storm lasting three days with eleven inch rain, 90 per cent run-off, what would be the height at Chattanooga, with no dam?

A. You are asking me a question now that the best engineering skill at Nashville and the best engineering skill in the Chattanooga district took two and one half years to work out.

Q. Did you work it out in that two and a half years?

A. Yes, I worked it out.

Q. Did you get the answer? What is it?

A. I did not work out the Kurtz plan, because it would destroy the resources of which I testified.

Mr. R. T. Jackson: Read the question and see if that has anything to do with the answer.

By Mr. R. T. Jackson:

Q. Make that the head at Chattanooga with no dam.

A. Eleven inch rain fall, covering the whole basin above Chattanooga.

Q. That is right.

A. What is the control now, in the uncontrolled area?

Q. What is that?

A. What dams?

Q. No dams at all.

A. The dams are not located at Chattanooga, they are located some as much as 200 miles above, and they do not cover every tributary above Chattanooga.

Judge Allen: We are assuming that there are no dams whatever.

The Witness: Assuming that there are no dams whatever?

Judge Allen: Yes.

The Witness: An eleven inch rainfall over the entire basin above, would make, probably something like the 500 year flood, or maybe larger.

By Mr. R. T. Jackson:

Q. It would make a gage height of probably 73 feet at Chattanooga.

[fol. 950] A. That appears high to me.

Q. Seems high?

A. But I could not tell unless I worked it out, and it would take a whole lot of computation to really give you a close estimate on it.

Q. Assuming the gage heights at Chattanooga would be in the order of 70 or 73 feet under the conditions of such a rain and run-off, what would be the reduction in stage at Chattanooga, that would be produced by Mr. Kurtz' system of flood detention, flood control reservoirs?

A. That would depend a great deal upon the way the rain fell.

Q. If eleven inches fell in three days on the drainage basin up-stream?

Judge Allen: 90 per cent run-off.

Mr. R. T. Jackson: With 90 per cent run-off, exactly.

The Witness: With a 90 per cent run-off, exactly. All right. I picture in my mind about the way that floods come. Let us assume, say about three inches of this rain fall fell the first day, and that it did not rain much for a day or two, or three days, something like that, and then more—

By Mr. R. T. Jackson:

Q. You will never get the eleven inches in three days if you get three inches the first day and no more after that.

A. All right. Let us have three inches the first day, two inches the next day—that is five,—then six inches the last day—that is eleven all together.

Q. All right.

A. Well, what would happen? The flood control reservoirs above will regulate the flow from that first three inches of the first day and spread it out along the main stream. The channel of the river will be full, so that when the rain-

fall on the second day comes along it will be spread along a little more of the channel, the channel will be somewhat larger all along, say up 200 miles above Chattanooga, all the way down to Chattanooga, and probably past. The rain on the third day, what would it be, six inches? Six inches would fall. The stage is set for all of that uncontrolled water that falls on all of the uncontrolled area, to come down the channel of the main stream very rapidly. Why? Because the channel of the river in its natural condition has a regulating effect on the control of floods, and that is caused by the fact that it takes considerable time for water [fol. 951] on the upper tributaries to flow down, go down the river, because as the head of the flood comes along it must fill all these little places, it must circle the banks and run out, so the actual progress of the volume of water is slow.

Now, let us take the system of reservoirs Mr. Kurtz has provided. The channel is full, the whole channel is full, and can bring the water down from the upper river very rapidly. So, I have pictured that in my mind, and I ask, what was the uncontrolled area?

Q. It is all uncontrolled.

A. All uncontrolled, not covered by the Kurtz system. What is the drainage area above the Kurtz system, tell me the total?

Q. I don't know.

A. I have not the figure in my mind, but looking at the map it is clear to me that it does not control all of it.

Q. Did you express an opinion on direct examination without knowing what the Kurtz plan covered, what it controlled?

A. Very well, if you do not want to give me the information I will take, say all of the uncontrolled water, six inches from the basin above, and we have the valley full of water, and bring it down very rapidly, and pile it up further down stream."

Examination by the Court:

That is my answer with the Kurtz system. There is no control with the six inches and none of that which is behind the dams on the third day would be controlled. You see there is a large area between the dams and Chattanooga and a lot of tributaries with low dams. If he would give me what the area was that was under control I would have

a very good idea of how much flood water was behind the dams, but I have a very good mental picture of that controlled area. All right, the valley is full of storage with it all stretched out along the whole channel and the whole channel is full. It is just the same as the dams displacing [fol. 952] the natural flood storage so that it would pile the water from the whole uncontrolled area and would advance very rapidly down to Chattanooga and beyond, plus the water from all of these reservoirs. It being piled up high, it would be coming at the most rapid rate of speed, it could possibly come out of those dams, it not being stopped. That would also add to the water on that day. Every bit of that that ran out would also come down very rapidly. Now compare that with the system which is being constructed by TVA of large reservoir projects on the major tributaries. For the purpose of this question, they would catch and hold back as much as they could of all of this storage. They would not let any of it by if they could help it, while the Kurtz plan just lets it go ahead and pour through and the greatest part of the danger there would be from this situation. Furthermore, we have now the whole of the main stream channel, the high dams with flood control system, it would be perfectly controlled, a very good control, I would say, all along the channel. It would absolutely stop any piling up. So you see my answer to those two projects, it is very simple as to the comparison of the two. As to the exact result, I would have to sit down and figure it out. I do know that the effect which I have described would occur.

Cross-examination continued:

"Q. Now, Colonel, will you answer my question if you can, and if you cannot, tell me; that is on the basis of the rainfall I have assumed and the run-off I have assumed, how much, if at all, would the operation of the Kurtz flood control reservoirs reduce the natural stage at Chattanooga, how many feet would you say it would reduce it, over 19 feet?

A. Let me think a moment. I will put the picture there for you, and I have got to form a mental computation. I [fol. 953] cannot—there is so much—I do not believe it is going to reduce the floods so awfully much here, not the height of them, the volume, there will be some of the volume

taken away, but on account of the situation it creates, it will pile up.

Q. You do think it will reduce the volume?

A. It will reduce some, yes, but I cannot show—I picture the flood peak like that (illustrating with hands) under the Kurtz plan; and when in the natural condition it is like this (illustrating). Do you see what I mean? I figure the flood height under the Kurtz plan, the hydrograph is something like that, whereas the ordinary type of hydrograph is something like that (illustrating).

Q. Colonel, for the same storm could you tell me how many feet, if at all, the TVA Unified Plan would reduce the gauge height at Chattanooga?

A. Considering the results I get from the Cove Creek, which is now the Norris project as given in those reports, I believe that the 1926 flood—

Q. Not the 1926 flood.

A. I am giving that as the basis of my estimate.

Mr. Fly: May it please the Court, I object to this line of questioning. He is asking this engineer to work out a theoretical flood problem that will take any competent engineer months to work out.

Judge Allen: Answer the question, Colonel, if you can, and if you cannot, state your reasons.

The Witness: I would like to answer it as briefly and as clearly as I can and not be interrupted.

From the results which I got in my report on the survey, which shows the results at Cove Creek or Norris Dam, and the series of dams on the main stream with the surcharge pondage, would have had on the 1926 flood at Chattanooga, was approximately 12 feet.

Now, the amount of storage in the Norris Dam is not as great as that contemplated in my report. However, they have the Hiwassee Dam in that program. I can mention the Fontana Dam, and so forth. Now, those are going to have an effect which will be probably greater than the Cove Creek Dam."

[fol. 954] The amount of storage at Cove Creek is not as much as provided in my plan and the flood I was just asked about is very much larger than the 1926 flood. For those other floods my studies indicated that the amount it would reduce the peak from the maximum at Chattanooga would

be approximately similar for larger floods on account of the similar shape of the hydrographs. The reduction would be about the same proportionately. I forget the exact amount of the 1926 flood. Assuming it was 45 or 50, 12 from that is 38. Suppose this larger flood was 60 feet, 12 from 60 is 48. It is then a reduction in feet from the amount of floods.

When I made these calculations from my mental picture, I had in mind that the Kurtz system of storage is ten times as great as the TVA control and I had a picture of approximately what the controlled drainage area under the Kurtz plan and the TVA Unified Plan was. I do not recall well enough without looking at the map to see whether the controlled drainage under the Kurtz plan was 75 per cent of the total area above Chattanooga and only 25 per cent in the TVA Unified Plan. My conclusions would not be affected by whether the controlled storage under the Kurtz plan was ten times that under the TVA plan because I assumed he made it large enough to iron it out. It does not hold the water there and it has no control over it whatever. It lets it out, it flattens it out, which is a benefit for the locality right above or below the dam. It is a danger at times for various parts of the river. I understand that at the peak those reservoirs would be actually holding back a volume of water ten times as great as the volume of water that [fol. 955] would be held back by the TVA Unified Plan reservoirs above Chattanooga in the case of a larger flood. There would be a considerable amount there at that time but I also know that it would have the channel full from 200 miles upstream all the way down and I also know there was this uncontrolled water as compared to the absolute holding out in our reservoirs and the absolutely effective regulation along the main stream. That picture I have in mind.

I also understood that the Kurtz reservoirs had gates as well as certain open sluiceways of limited size but I know the method of operation and if I am not mistaken he bragged about the fact that it was automatic. You would not have anything to do, just let the reservoirs take care of themselves. I thought he said that is the way he would operate them; they could operate the other way. He stated, if I am not mistaken, that the operation would be automatic which means that the greater amount of storage you have got in there, the greater amount of water which would be

coming out. In other words they are effective just below the dam but it does not have that faculty of catching and holding right out of the river so that it will not endanger other areas. It does not hold it out, it lets the water still pour through.

"Q. You didn't understand then that the outflow from those reservoirs would be set at a predetermined rate, and would not increase, no matter what the inflow might be, until the reservoir was full?

A. It would not exceed it, you mean?

Q. Yes, would not exceed that.

A. If it was automatic you couldn't help it. The higher the reservoir, the greater the flow.

Q. Not until it went over a spillway, would it?

[fol. 956] A. Oh, yes, the higher the water, where it is uncontrolled in this exit, or this gate.

Q. It was not uncontrolled, you understand that, don't you?

A. I know that he stated it would be automatic, and the higher the water rises in the reservoir, the greater and greater and greater the amount of water that will run out of that thing.

Q. Didn't you understand he said there would be gates that would be worked on a preconceived schedule that would regulate the outflow as well as the inflow?

A. I don't recall that.

Q. You didn't understand that when you made your answer?

A. No."

I did not testify that Cove Creek alone would have reduced the height of the 1926 flood at Chattanooga by something over 12 feet. Case one in the Table at the bottom of page 72 of my report (Complainants' Exhibit 105) shows that Cove Creek alone would have reduced the flood height at Chattanooga in the 1926 flood by 5.7 feet. Case three on the same page shows that Cove Creek and the ten foot surcharges on the high dams on the main stream above Chattanooga would have reduced the flood height at Chattanooga in the 1926 flood by 12.1 feet. I do not know that if there was a flood of the size about which you inquired (70% larger than the Chattanooga flood of 1867), Watts Bar and Coulter Shoals would be completely flooded out. You have got to

show me, when you get those reservoirs up here, and these projects along the river. I would like to work it out.

"Q. Then you are answering without the benefit of ever having made any study to determine whether a flood 70 per cent greater or higher than the great flood of 1867 would flood out entirely Watts Bar and Coulter Shoals as they are proposed by the TVA?

A. Oh, there is data in the report there that I can point [fol. 957] to, I can give it to you right now. I am rather inclined to think that they would not flood out, those two.

Q. You think they would not?

A. May I look at the date in the report? I can answer it, if it is material to the issue. Frankly, I don't think all that is material to the issue.

Q. All right, just tell me this, is your testimony as to the effect of these dams in a large flood of the size I have asked you about based upon the assumption that such a flood would not flood out Watts Bar and Coulter Shoals Dams?

A. Absolutely not.

Q. All right.

A. I didn't make any such assumption because it doesn't affect anything I was working on in that case, and it doesn't affect this case."

Examination by the Court:

My testimony with reference to the reduction of 12 feet in the flood height at Chattanooga was based upon the proposition that Norris Dam would be operating together with the other dams in the system, and the statement with reference to 5.7 feet was based upon the operation of the Cove Creek Dam alone.

Cross-examination continued:

"Q. But in your present testimony you do not care whether Watts Bar and Coulter Shoals are flooded out or not, is that right?

A. Of course, I care. I don't want them flooded out, but it has reference to that situation as I have stated it.

Q. All right, Colonel, let's go to something else. Now, one question about the downstream situation. When you [fol. 958] get down below Chattanooga, at least in the past, damages have been largely caused from flooding or overflows of land, flooding the lands, haven't they?

A. As I recall, that is true. But now, listen——

Q. Well, you don't need to go any further so far as I am concerned.

A. Yes, I do, in order that the Court may know the truth, the whole truth and nothing but the truth. Now, I think as I recall, most of the damages below are from the overflowing of land. Now, let's think a minute. I am recommending, and the TVA is constructing a project for the development of the resources of our waterways, which I have already testified in the case beyond a reasonable doubt, that it will bring about the industrial development of the resources of the waterways. If that be true—and furthermore, the indications are that it will be a rapid increase. Under those conditions——

Judge Allen: Pointedly, your point is that there would be also damage from obstruction to industrial development?

The Witness: Exactly, which will be developed all along the river, and throughout the area, your Honor. That is the idea exactly.

Judge Allen: All right.

The Witness: So we cannot picture the damage today and say that the damages today have any bearing upon what they will be in 1950 unless we figure what will be the situation of the development of the area in 1950. Do you see the idea?

Q. I am afraid I don't, Colonel, but if you will just keep to the point of time that I can visualize, it will help me on that, and then I will let you go on the other as far as you want to.

Q. Now, you have told me that the principal, at least, actual damages incurred up to this time have been overflowed land down below Chattanooga?

A. That is correct up to the present now.

Q. That is right. I understand that you have a mental reservation about the future. Now, isn't it a fact that the TVA Unified Plan will permanently flood many many thousands of acres more land in the Tennessee Valley below Chattanooga than is occasionally flooded under existing conditions, or under natural conditions?

[fol. 959] A. I think that a very good point to clear up.

Q. Well, just answer it first, and then——

A. No, I don't know it, because your estimate again is

not correct. No, it is not correct. But now, let me clear it up and make clear and explain, which I may, if I may.

Q. All right.

A. The proposed projects in the report, and those now being constructed by The Tennessee Valley Authority will overflow, the pool will overflow a great deal of land. The estimates in my report include full compensation for that land overflowed. It puts that land to use, as an element of the navigable water-way and flood control system, just like buying the land and putting this building on this ground here for certain purposes, so that that land which is being overflowed has fully been compensated for and is being put to a very useful purpose. Now, along that valley, and along that land, throughout the whole of the region there are still large areas which today are overflowed by the floods. When you get the system completed it will not be overflowed, and it will be possible for people who desire summer homes to go and put houses of recreation right along the river bank for the people to live there. They cannot do it today.

Q. No?

A. So now, will you picture the valley now under the TVA Plan and now under the present conditions.

Q. Colonel—

A. Does that clear up that point?

Q. I understand that you have adopted the heroic method, or recommended it, whereby there will be no annual flooding of those lands in the lower Tennessee Valley because you will have premanently flooded them for all time?

A. No. Let's—

Judge Allen: Well, your answer is, isn't it, Colonel, that necessarily the land beneath the pools of the dams will be covered with water.

The Witness: That is true.

[fol. 960] Judge Allen: And underneath the pools will be permanently covered with water, isn't that right?

The Witness: That is correct.

Q. Presently it is farmed, isn't it?

A. May I complete my answer?

Judge Allen: You have really explained it; I think.

Q. Now, the Gilbertsville Dam alone will flood somewhere around 140,000 acres of valley land, won't it?

A. It will flood a large area.

Judge Allen: The Court feels that this matter does not need to be gone into any further. The record shows that the land taken has been covered with the water of these pools; that it will be permanently so covered for the uses of the dams, and for the uses of navigation. Now, we do not need to go into it any further.

Mr. R. T. Jackson: If that is so, I merely want to bring out this, that it is going to be flooded for flood control permanently, that it is going to flood permanently a great many more times as much land—

Judge Allen: That is another question. The Court will decide the question that you are raising here. So far as the facts are concerned, Mr. Jackson, they are in this record.

Mr. R. T. Jackson: I say I was merely trying to make sure they were in the record. I think your Honor is right, that they are in the record at the present time.

Judge Allen: They are abundantly in the record.

Mr. R. T. Jackson: If that is true, I certainly shall not try to get them there by this witness.

Q. Colonel, I invite your attention to this statement at page 79 of Exhibit 105, which is a copy of your report, reading:

'While the amount of water held out by reservoirs in the Tennessee River Basin appears large when compared to flood flows in the Tennessee River Basin, this amount is small as compared to flood flows of the Mississippi, and studies made by the Board preparing plans for flood control of the Mississippi indicate that the waters held out by flood reservoirs of this stream would not have a very great [fol. 961] effect on floods on the Mississippi, and as reservoirs used primarily for flood control of the Mississippi would require the use of sites necessary for the proper development of the Tennessee River for navigation, water-power, and flood control, they would prevent the proper development of navigation, water power, and flood control in this basin.'

And ask you whether you still are in agreement with that statement?

A. As I understand the question was concerning the very—

Judge Allen: Do you agree with it, Colonel?

The Witness: I have to find out what dams they were, your Honor?

Judge Allen: All right, look at it, and then say whether you agree with it, and then make your explanation.

A. Yes, I agree with it. I would like to explain however, what those particular reservoirs are. Those reservoirs are the same three large reservoirs concerning which he asked me the question before. In other words, they are three reservoirs which the Mississippi River Commission asked me to investigate or ordered me to investigate for further flood control on the Mississippi.

Judge Allen: What reservoirs are they?

The Witness: They are the three large reservoirs, one at Aurora Landing, one at Dam No. 3, and one at Chickamauga. They are not a part of the approved plan, and were turned down."

Those three reservoirs involved storage capacity of 7,508,000 acre feet.

I agree with the following statement of the reviewing report of the Board of Engineers in House Document 328 (Complainants' Exhibit 105) s' Paragraph 47 on page 23:

"The District Engineer has st. vn that the construction of large reservoirs on the Tennessee and its tributaries for the primary purpose of controlling Mississippi River floods is physically possible but is entirely unjustified. The reduction in flood heights which could be produced would be of no great magnitude, while the diversion of valuable reservoir sites from their natural use for power development would cause economic losses far greater than any flood control benefits which could be expected."

[fol. 962] I would like to explain again that those are the three high dams which were turned down by everyone and they were destroying the resources just like the Kurtz project and the low dams would.

"Q. All right, Colonel, I direct your attention to this statement of the Chief of Engineers at page 3 of Exhibit 105:

"The operation of the storage reservoirs on the Tennessee for the primary purpose of restricting floods in the Missis-

issippi would have no marked effect on the plans for flood control there, but would seriously injure the value of the power possibilities of the Tennessee basin. If the reservoirs were operated for the primary purpose of power in the Tennessee basin their effect on Mississippi River floods may be taken as negligible.'

And ask you whether you agree with the statement of the Chief of Engineers?

A. That was written at a time——

Judge Allen: Do you agree with the statement?

The Witness: Not now, your Honor.

Judge Allen: All right.

A. If I might explain, the Act of 1928 directed the Chief of Engineers to make a study of reservoirs on all of the tributaries of the Mississippi, with a view to determining whether or not such reservoirs would materially change the Jadwin plan which had been adopted, and they started to go ahead and construct it. There had been a lot of effort made to have reservoirs constructed under the belief that they would,—that this Jadwin plan was unnecessary. So they called upon all of the district engineers to submit information as to what would be held out under two plans. One was big high dams primarily, and the other projects for the development of the river for the purpose of navigation and flood control in combination with power, you see. So that both those plans were worked out. Now here he speaks of,—these that he speaks of are the high dams primarily for the flood control on the Mississippi."

[fol. 963] Examination by the Court:

The Jadwin plan was a separate project but there was a question on account of all of the belief of a great many engineers throughout the United States that if you put reservoirs on here you should not build that plan. The Jadwin plan embraced dykes, mattresses and diversion of the current, and provides for levees to keep the water to the main channel until it would start to overflow and then by-pass it, extending all the way down from the Ohio to the Gulf. It changed the current of the river too and improved the river in spots. That was a large plan. The question was would the reservoirs on the tributaries of the Mississippi make

that unnecessary. The data which I selected was sent to the President of the Mississippi River Commission for his use in determining that question. At the time the report was submitted, the studies had been only partially completed. I asked from the President of the Mississippi River Commission information as to what effect the data which I submitted to him would have upon the flood control of the lower Mississippi. The big question at that time was would it require a change. It was known perfectly well that you would have to carry out the levee system anyhow and the only question involved was whether or not there would be a material change in the plan, so the wording there states that it would not materially affect the plans. Since that day there have been studies on the complete system of flood control and a study on a comprehensive system of reservoirs on the tributaries of the Mississippi for flood control has been completed and gone up to Congress with the recommendation of the Chief of Engineers in it. It is found in that that reservoirs on the tributaries can materially benefit [fol. 964] the flood control of the lower Mississippi and may eventually be so much that it will avoid the necessity of ever sending water down these by-passes. The benefits estimated by the President of the Mississippi River Commission as to the justification of constructing reservoirs on the tributaries was to the effect that the benefits due to that very flood control which these reservoirs on the tributaries would bring about, was sufficient to pay for about one half the cost of these reservoirs, and it recommended that the Federal Government undertake a program for participating, at least, in the construction of such reservoirs. Since that first report there has been a second report in which the Chief of Engineers has recommended to Congress the construction of a large number of reservoirs on a great number of tributaries, which is for that purpose. So you see it does right now constitute a very important element of flood control on the lower Mississippi.

"Mr. R. T. Jackson: I move to strike out the last statement. That is not my understanding of the facts as they have been proven.

The Witness: I said it is a fact.

Judge Allen: The Court understands that the witness is expressing an opinion of all the testimony on that question, and allows that as such."

Cross-examination continued:

"Q. Now, you gave some testimony with reference to navigation by the low dam plan and by the TVA Unified Plan on the Tennessee and stated that boats travelling in the high dam system can travel at about 12 per cent higher speed than in the low dam on account of the delay in passing through the locks. How long did you estimate it would take to make a round trip between Paducah and Knoxville, [fol. 965] using the waterway resulting from The Tennessee Valley Authority Unified Plan, leaving out of consideration the Wilson Dam and the Hales Bar Dam, which would be common to either plan?

A. The total length of the river is about 600 miles, I believe. The length of the Wilson Dam pool and the Hales Bar pool is about, between 40 and 50, something on that nature. Subtracting that from 600 will give you about 560, roughly. You can work it out, put down the actual figures from the book. Now, assuming that boat travelling at 6 miles an hour, in the first place, 6 into 560 is 9—90 hours, a little over. That is right, isn't it? It would require them 90 hours if they were not delayed, travelling 6 miles an hour, to travel through that portion of the main stream to be covered by the new project.

Q. I mean travelling the whole distance, but you are to take no account of the lockage at the two dams for they are common to both?

A. Yes, that is what it is. May I continue?

Q. You have answered as far as I am concerned.

The Witness: No.

Judge Allen: Have you explained your answer?

The Witness: I have not explained where I get the 12 per cent, your Honor. I am trying to make a detailed statement so he will have it, make it clear to his engineers without the shadow of a doubt.

Mr. R. T. Jackson: It will only delay the cross examination.

Judge Allen: The witness must answer the question, but he is entitled to explain his answers. He may proceed.

The Witness: Yes. So that with a boat travelling 6 miles an hour, it would travel through that part of the stream in 90 hours, about. Now, let us take the delay at the locks. There are 32 locks in the low dams. There are seven in the high. Subtracting seven from thirty-two we have twenty-

five. All right. The average delay at the locks considering all things, is about one half an hour. Multiplying that by 25 gives us, 2 times 5, say—that is 50 hours,—no, that is not right.

Judge Allen: $12\frac{1}{2}$ hours.

The Witness: $12\frac{1}{2}$, excuse me. All right. Very well. $12\frac{1}{2}$ divided by 90 is somewhat over 12%, say."

[fol. 966] I estimate that a tow of eight barges in the high dam system will make on an average on the round trip about six miles per hour, and I think that is considered as practical. Under the low dam system it would not be greater. It would not be that great.

It is 650 miles from Paducah to Knoxville. I estimated that the time it would take for the lockage through a low dam in comparison to the lockage through a high dam would be practically the same, that is, the actual time of the boats going through the locks. The delay at the locks will not be the same for a low dam as for a high dam. That is another thing. The delay at the locks is just an average of a number of factors which includes the stopping of the boats, the time it has got to slow down instead of going on at six miles an hour just past the site. You have got to slow down as it comes in. You will take off a great deal of time before you get to the lock.

Examination by the Court:

If you have a dam 30 feet high and a dam 100 feet high, there is very little difference in lockage time for the same boat because the actual time for going through the lock is only a small part of the total time in making the complete lockage. By actual experience we fill the locks in these high dams, up to 50 ft. locks, in about the same time we fill the locks in the low dam system. So you see there is very little difference so far as that element is concerned. The other factors of delay which I might mention is the approach to the lock, the time of actually going through the lock, which is a part of the factors, that is, the tying up [fol. 967] of the boat, the breaking up of the tow, and the tying of the barges and putting them in the lock. There are other things also; when you are approaching at one time a lock from above it will be filled so that you can go right in, and at another time it will be down. Sometimes

there is a boat coming up in the other direction. There is very little difference in time which would be required to go through the locks on a high dam as compared to a low dam. I do not allow any difference in time because I think on the average it will be about the same. Actually, you can go through the high dam lock more quickly than you do the low dam locks for the simple reason they are shorter, the time of actually going through is not so long and you carry only a boat and three or four barges through. In a high dam lock with a big tow, when the big tow gets to the high dam lock you have to send through the first four barges and the last four, and that will require a little longer time.

"Judge Allen: Let me get that straight. Do you mean the high dam will permit more barges to be put through than the low dam?"

The Witness: At one loading, your Honor."

Actually a small tow can go through a high dam more quickly than through a low dam, which is due to going through the lock and the delays in going into the lock part of it. The lockage part of it is much more on the low dam than on a high dam, all things considered. I think the usual estimate is to be considered on the average dam for tow-boats to go through is about the same.

[fol. 968] Cross-examination continued:

Going through these locks 60 ft. by 300 ft. in the TVA Unified Plan above Wilson Dam, there is a breaking up of the tows plus also the filling of the lock and putting the second one in. I am simply taking the general experience and the fact that that part is a very small, minor part of the total delay. It is my testimony that whether you have to break a tow at a lock is an insignificant element. It would not more than double the time of the lockage.

"Q. You have to go through the lock twice, don't you?"

A. That factor which we use to consider, and the Court wishes to consider, is the total delay of passing through the lock.

Q. If you will just answer my question, Colonel.

Judge Allen: He has answered. He said no.

A. Yes, that is my answer.

